Vol. 9, No. 1 JANUARY, 1954

AGRICULTURAL CHEMICALS

In This Issue:

ESA Meets in Los Angeles

Senator Russell Looks Ahead for the Farmer

Progress in the Granulation of Insecticides

Fungicide Test Summaries for 1953

Cotton Insect Control Recommendations for 1954

Joint Committee on Fertilizer Application Meets

New Fungicides for Fruit Disease Control

First National Weed Control Conference Held in Kansas City

MALATHION

- kills DDT "resistant" flies.
- has low toxicity to warm-blooded animals and humans.
- has residual effect up to 3 weeks.
- can be used as bait spray for flies around buildings, homes, yards, dumps, stables.
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- accepted by USDA for use inside dairy barns.

Powell offers Malathion concentrates in forms easily mixed for standard application procedures: —

- 5 lb. per gallon Emulsion Concentrate.
- 25% Dust Concentrate.
- 25% Wettable Powder.

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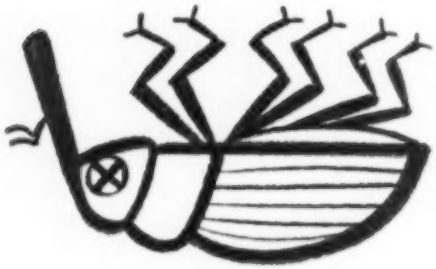
he never heard of Attaclay



Carriers for soil pesticides

We are leaders in developing granular grades for soil pesticide formulations. Write for samples and your copy of our new, 7-page report on this promising field.

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May we send you a generous free sample—and help you if technical questions arise?

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AGRICULTURAL CHEMICALS

This Month's Cover

The Tennessee Valley Authority has become a real technological "experiment station" for the fertilizer industry. Here is an overhead belt conveyor and storage bins for loading fused tricalcium phosphate into railroad cars. See TVA article, page 44, this issue.

JANUARY 1954

Vol. 9 No. 1

A Monthly Magazine For the Trade

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AGRICULTURAL CHEMICALS

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Entered as second-class matter November 4, 1949, at the Post Office at Baltimore, Md., under the Act of March 3, 1879.

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AMMONIUM SULPHATE NITRATE

26% NITROGEN

supplies the 2 key forms of nitrogen

Contains 6½% nitrate nitrogen — quick acting for early, vigorous growth. Contains 19½% ammonia nitrogen — slower acting for sustained growth through to harvest time.

easy to use

Pelletized and properly sized for flow. Easy to handle, ready to use for top dressing, side dressing and irrigation.

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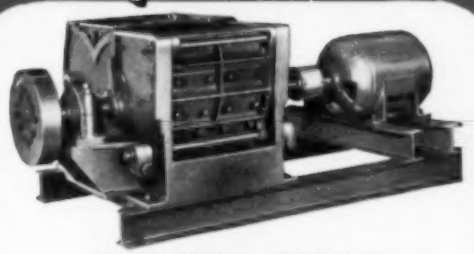

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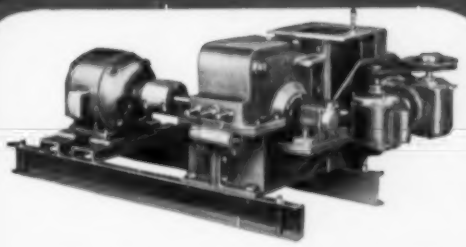

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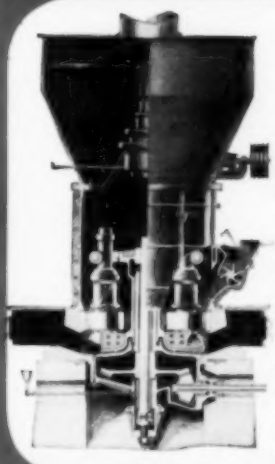

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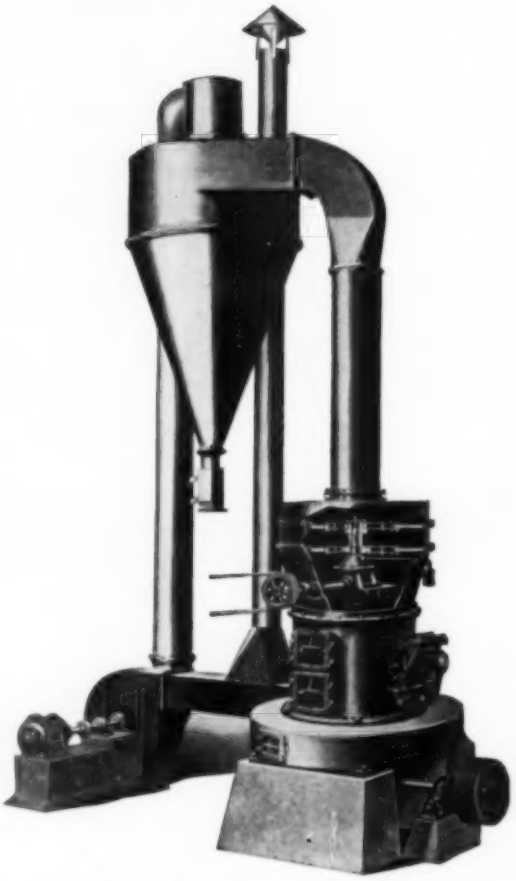

THIS modern Raymond Roller Mill installation in scores of plants is proving its ability to handle all of the newer, as well as the standard, insecticide formulations . . . the complete job of pulverizing, blending and classifying in one integral unit of equipment.

The following are some of the typical results:—

In one plant, a small Whizzer Type Roller Mill is pulverizing a 50/50 DDT mixture to a fineness of 99% passing 325-mesh, and delivering a uniform product at a capacity of 1200 to 1500 pounds per hour.

In another plant, a Raymond High Side Roller Mill with Whizzer Separator is producing several grades of rotenone bearing roots at finenesses of 95% minus 200-mesh, 95% minus 100-mesh and 80% minus 100-mesh. Capacity range 600 to 1750 pounds per hour.

The Raymond Roller Mill is equally efficient on sulphur-bearing formulations, as well as various concentrations of DDT, BHC, Toxaphene, Chlordane and similar products. Ease of control, economy of operation, uniformity of production, as well as clean, dustless, automatic handling of material, make the Raymond Roller Mill the best choice for your plant.

Write for Raymond Bulletin No. 68 . . . and let us know your type of product, so we can advise you on the proper equipment.

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Sul-Po-Mag®

WATER-SOLUBLE ($K_2SO_4 \cdot 2MgSO_4$)
DOUBLE SULFATE OF POTASH-MAGNESIA

CONTAINS SOLUBLE MAGNESIUM

THE FOURTH ELEMENT

in

on

put it in the bag — put it on the bag

Dealers are looking for the analysis on the bag that shows the fertilizer contains *soluble magnesium, the fourth plant food element.* In many crop-growing areas from coast to coast, their farmer customers are getting finer quality, more profitable crops on magnesium-deficient soils when they use fertilizer containing soluble magnesium.

More and more fertilizer manufacturers are including *Sul-Po-Mag* in their quality grades in order to supply soluble magnesium in the most practical and economical form.

Sul-Po-Mag is a properly balanced combination of *sulfate* of *magnesium* and *sulfate* of *potash.* Both are water-soluble and immediately available to growing crops. *Sul-Po-Mag* is produced exclusively by *International* at Carlsbad, New Mexico, in bulk for mixed fertilizers and bagged for direct application.

By including *Sul-Po-Mag* in the bag, you supply the farmer with a better quality fertilizer, properly balanced with the basic nutrients required for healthy crop growth and profitable yields. It will pay you... in added prestige and performance of your fertilizer ...to include soluble magnesium—the fourth element in your quality grades. So...when you put it *in* the bag, put it *on* the bag, too: Nitrogen, Phosphate, Potash, *Magnesium.*

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Potash Division

INTERNATIONAL MINERALS & CHEMICAL CORPORATION

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Making Your Bags is Our Full-Time Job

Photo at right shows V-C engravers making printing plates. Well-designed, expertly printed bags have real sales appeal—put your product out front. Photo above shows one of V-C's multi-color printing presses.

A battery of sewing machines staffed by highly-trained operators and inspectors. Modern machinery, skilled operators, and diligent inspectors, mean better-built, longer-lasting V-C Bags for your product.

THE BAG you use to package your product is only one of many items essential to your business success. But to the V-C Bag Division, the manufacture of better bags is a full-time job. That's why it will pay you to discuss your bag problems with a V-C representative. Possibly he can make suggestions that will improve or lower the cost of your packaging. Let him tell you about V-C's expert designing, printing, construction, and speedy service and delivery of V-C Multiwall Bags.

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The use of potash is an investment in the land that brings big returns in better crops and better business.

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A PRODUCT OF NEW MEXICO U.S.A.

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GRANULAR MURIATE OF POTASH 60% K_2O MIN.

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The two Greatest Insecticide Successes since DDT

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IN JUST A FEW SHORT YEARS aldrin has established an outstanding insecticide record. Its fast action against major crop pests has protected farm production and its low cost has meant widespread usage on many crops.

Soil Insects

For example, the control of underground insects has now become economically possible with the development of aldrin. Aldrin is unsurpassed for the control of major soil pests.

Here are just a few:

rootworms
wireworms
white grubs
chinch bugs
green June beetle larvae
European chafer grubs
sugar beet maggots
Japanese beetle larvae

Grasshoppers:

From the test tube on, aldrin has been the international "hopper-stopper." Whether halting the attacks of these voracious crop-eaters in North America or ending the famines caused by its cousin, the locust, in the Middle East, nothing approaches the incredible 99% control of just *ounces* of aldrin *per acre*.

Cotton Insects

And aldrin has been a boon to King Cotton! Its fast and low-cost control of the boll weevil has boosted yields and profits for thousands of growers.

dieldrin

Dieldrin leads the parade of those organic insecticides which have long residual action. And it controls a very wide variety of insects. For that reason, dieldrin is a fine stock item to meet the needs of growers *around the year*. Here are a few examples of dieldrin's versatility:

Cotton boll weevil · thrips cutworms · plant bugs	**Turf Insects** ants · Japanese beetle larvae white grubs · chinch bugs
Public Health Pests houseflies · mosquitoes fleas · ticks	**Vegetables** tuber flea beetles · leaf miners onion thrips · root maggots
Fruit plum curculio "catfacing" insects	**Cereal and Forage Crops** armyworms · alfalfa weevil chinch bugs

Aldrin and dieldrin can be formulated into dusts, wettable powders, emulsible concentrates, and granules—all common formulations. Your sales of these insecticides are backed by State and Federal recommendations, the finest of technical service, and a comprehensive advertising campaign. You'll find them good products to offer to your customers.

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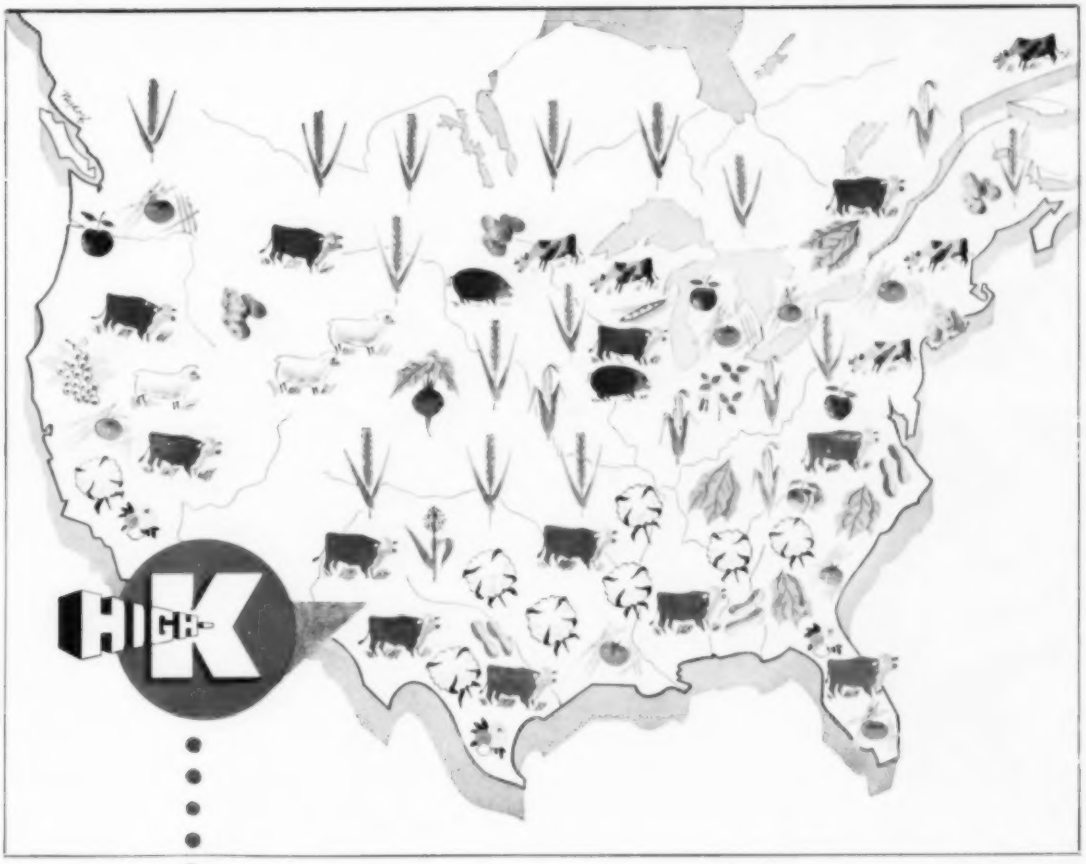

Southwest serves agriculture

...by using modern mining facilities and up-to-date processes to produce HIGH-K* Muriate of Potash for plant food manufacturers.

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HIGH-K Potash

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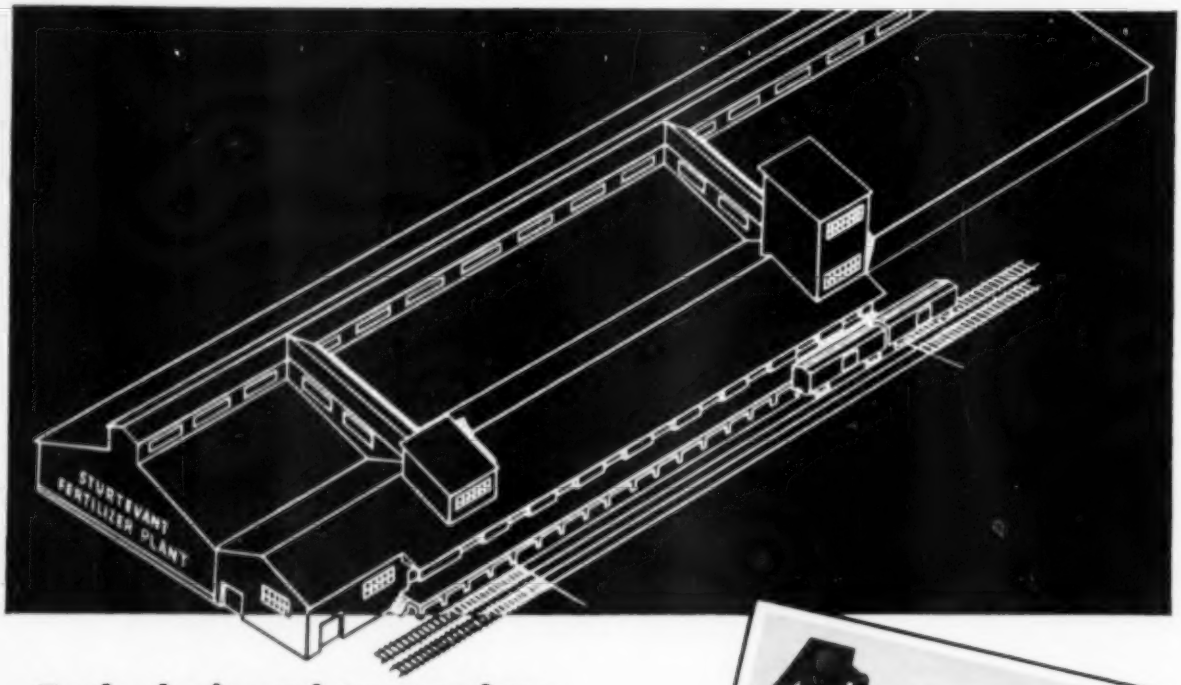
STURTEVANT builds them all...



Each designed to produce maximum Fertilizer output

For over 71 years, Sturtevant Mill Company has been closely associated with the fertilizer industry . . . designing and supervising the construction of complete plants, and building quality machinery from individual machines for specific applications to complete processes, that speeds up fertilizer output, reduces overall production costs.

A recognized leader in the industry, Sturtevant Mill with its vast fertilizer manufacturing experience and know-how can effect operating economies for you.

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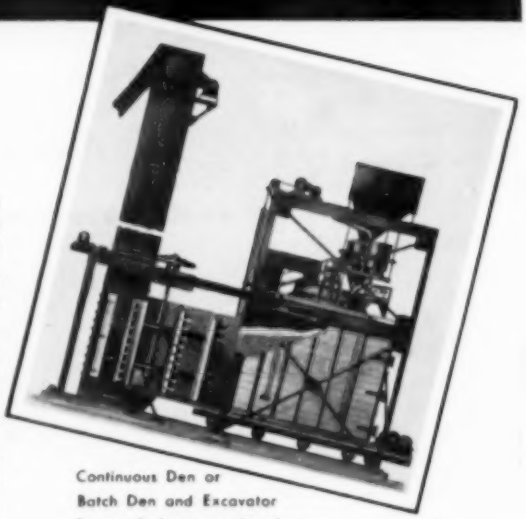

Continuous Den or
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for producing superphosphate.

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- MITICIDE K-101
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Organic Chemicals Division

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Enough to make the difference

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"PROBLEM PRODUCT" PACKAGING
—specialists to study your requirements.

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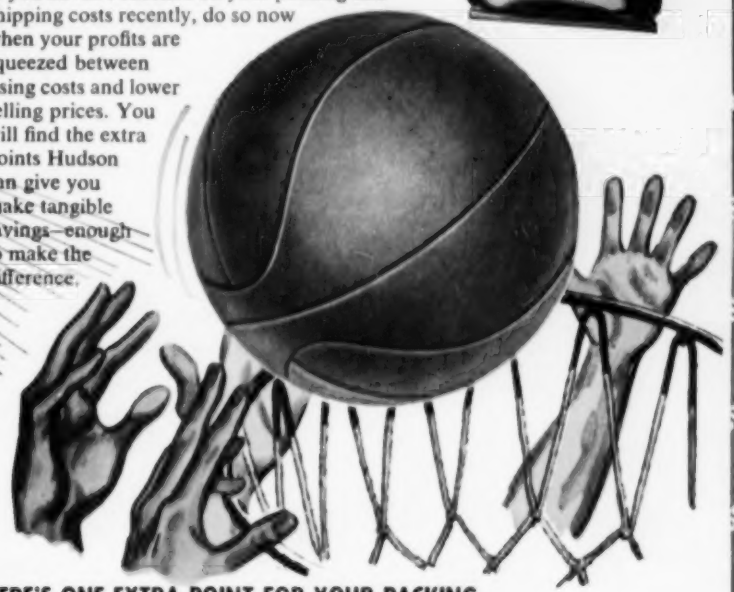
With multiwall sacks, too, strong contenders are matched to excel in supplying your needs. There are differences between their services and their sacks which, taken individually, may seem small. But over the whole season, these extra points are enough to make the difference.

If you haven't checked on your packing and shipping costs recently, do so now when your profits are squeezed between rising costs and lower selling prices. You will find the extra points Hudson can give you make tangible savings—enough to make the difference.



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From tree planting to finished sacks, Hudson controls and supervises the production of your multiwall sacks. With no less than 39 inspection and testing steps along the production line, Hudson has gone well beyond the call of duty to make certain the sacks you get will perform to your complete satisfaction. Because of this thorough testing, Hudson can give you a written guarantee of satisfaction. See for yourself the complete story of how Hudson multiwalls are produced. Send the coupon below for the book on how Hudson sacks are made, inspected and guaranteed. Illustrated with over one hundred action photographs.

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whether you buy or sell

The farmer who buys fertilizer wants good results from every sack of fertilizer he buys – that's what builds his profits. Manufacturers, such as yourself, are equally anxious for consistent and uniform results because that's how you build a repeat business – and that's what builds *your* profits. Uniformity is an important factor to you and to the farmer. It's ***enough to make the difference!***

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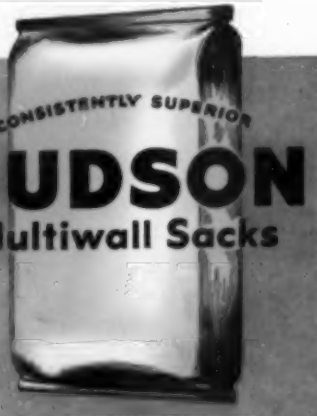
Hudson Multiwall Sacks are guaranteed to be uniform. Every sack you buy is just like every other one – no need to stop production for machine adjustment. Hudson's 39 point test and inspection program assures satisfaction. Investigate Hudson Multiwalls and see how uniformity can save your money.

Check over this list of 100% services that Hudson Multiwall Sacks offer you.

Mail the coupon on the other side of this page for complete information.



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20 Chlordane for the Control of Swine Mange	315 Chlordane Controls Turf Insects
23 Chlordane for Japanese Beetle Control	316 Chlordane Controls Wireworms in Tobacco Transplant Water
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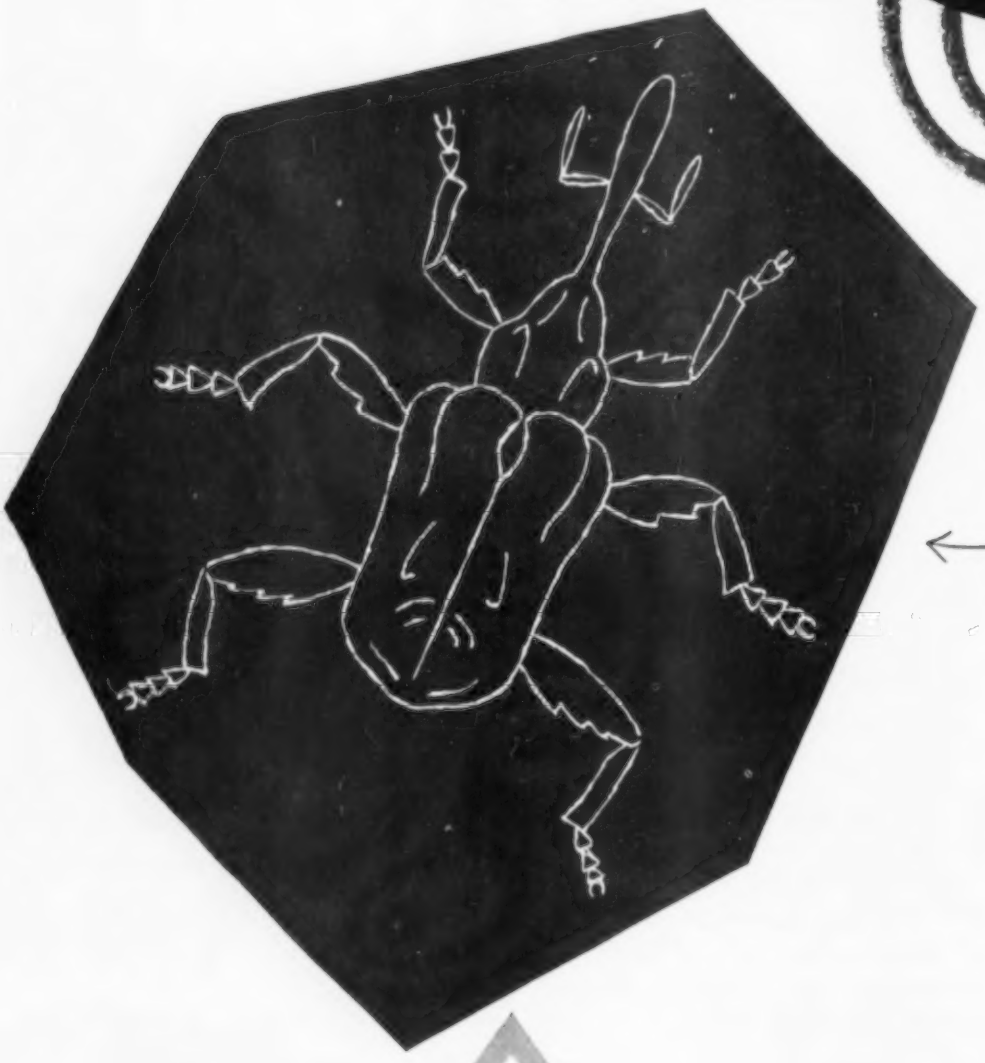

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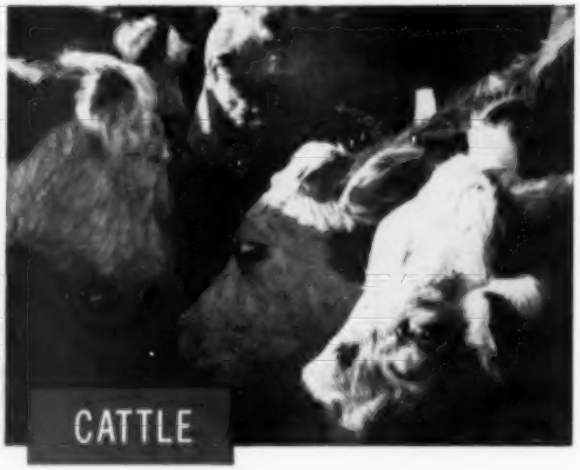

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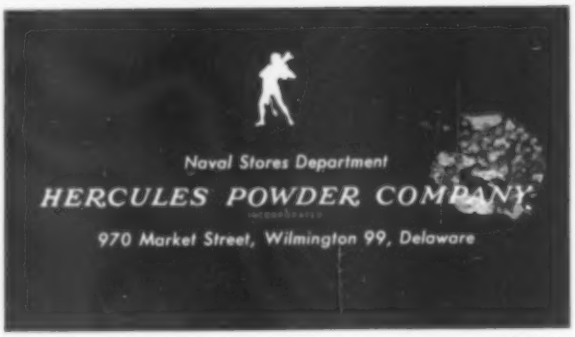

NRS-17

Editorial
COMMENTS

A WAVE of scare stories based on the supposed hazard of toxic insecticide residues has again appeared in many newspapers over the course of the past few weeks, leading to the belief in some quarters that the stage might be getting set for some fearless government bureau head to ride up on his white horse and issue an edict which would effectively strike down the "food poisoners" and defend the dear public, so beloved by bureau heads, from the supposed fearful hazard to its food supply. As a matter of fact, one of the weekly news letter-tip sheets, which makes a habit of being right more often than wrong, recently came out with a prediction that the government "will write tighter rules in '54" . . . "thinks public needs more protection from residue on fruits and vegetables."

Those interested for one reason or another in getting new and much tougher legislation or regulations affecting pesticide use have very plausible arguments, and a case which can readily be presented so as to arouse the public and stimulate legislative action. It is the type case that can be rebutted successfully only by presenting, as often and as loudly and prominently as possible, the contradictory facts, — of which incidentally there are a great volume.

For example, Dr. Robert Metcalf, of the University of California, Riverside, one of the country's leading entomologists, lost no time last month in answering the charge brought by a Connecticut physician that widespread use of DDT has increased the incidence of disease in man and animals over the past ten years. Dr. Metcalf noted that there is "absolutely no proof" to substantiate this charge. "There is no evidence," he asserted, "that DDT has caused any new diseases."

Dr. P. J. Chapman, head of the department of entomology of the New York State Agricultural Experiment Station, Geneva, N.Y., adds his informed opinion to the overwhelming weight of scientific evidence which agrees with Dr. Metcalf's side of the case. Says he, in an article which appeared originally in the *New York State Horticultural Society News Letter,* and which is reprinted in this issue of *Agricultural Chemicals* (pg. 37) "no one has ever been killed or made definitely ill, to the writer's knowledge, by eating foods that may have borne traces of spray residues."

A similar opinion is held by Dr. W. J. Hayes, Jr., chief of the toxicology section of the U.S. Public Health Service Technical Development Laboratories, who recently concluded on the basis of extensive studies on DDT made in the laboratories that "the danger of chronic toxicity is negligible."

The statement by Dr. Chapman summarizes the whole situation very well when he cautions the public that current concern over the possible hazard of spray residues may well be classed as "straining at a gnat," for he warns that "without pesticides we would not be able to produce sufficient food to feed this nation." His message is an important one, — not only for the pesticide industry alone, but for the farmer and food packer as well, and particularly for the millions

(*Continued on Page* 131)

Two Cornell Entomologists Discuss Working Properties

Granular Insecticides

GRANULATED insecticides would appear for several reasons, to be ideal for treatment of loose-turf, permanent, hillside pasture. Because of their particle weight, drift of toxicants to nearby pastures is eliminated. They penetrate the pasture foliage instead of remaining on the leaves to create a possible residue hazard. This penetration brings the particles near the roots of the grasses where, aided by precipitation, they soon penetrate to the level of grub activity. Granular materials can be applied by any one of several machines commonly available on most farms.

The early successes of Farrar (1953) and others in the use of granulated insecticides for the control of soil-inhabiting and other insects prompted the authors to try such formulations of several insecticides for the control of the European chafer, a destructive annual grub of pasture sod in central New York. While from a practical point of view granular materials appeared to be ideal for treating pastures, information was needed to determine if such formulations were as effective for the control of the grubs of the European chafer as conventional formulations of the same insecticides.

Earlier work by Burrage and Gyrisco (1952 & 1953) had indicated that aldrin, dieldrin, heptachlor and chlordane as conventional dusts and spray formulations, were ideal for the control of the grubs of the European chafer. Hence, these insecticides at proven effective concentrations along with toxaphene, an experimental material, were chosen for trial as granular formulations (Table 1). All of the insecticides except aldrin were impregnated on 30 to 60 mesh "Attaclay."** Aldrin was impregnated on tobacco waste, the bulk of which would be retained by a 60 mesh screen.

A complete randomized block experiment in which the treatments were replicated four times was laid out in a heavily infested pasture near Newark, New York. The plots were one-hundredth of an acre in size. All plots were treated with a small hand-operated fertilizer spreader.

In trial runs of the machine, difficulty was encountered in distributing uniformly the small amount of toxicant needed for each plot. Although the spreader had an adjustable gravity feed outlet and a narrow ribbon vane feeder, it was impossible to adjust the machine so that the small amount of insecticide could be distributed evenly over the entire plot.

Using aldrin, which came as a 2 per cent proprietary tobacco by-product formulation, a somewhat more even distribution was obtained in trial runs but even with this material, which had a greater bulk density than the Attaclay formulations, it was impossible to achieve good even coverage. There is no question that the greater bulk and slower flow of the tobacco stems is superior to Attaclay where a slower flowability is desired.

It was soon apparent that further dilution of the impregnated granules to provide greater bulk was necessary if even coverage of the plots was to be achieved. Since addition of inert granules to the impregnated granules would change the formulation of the impregnated insecticide, it was decided that an inert dust of a different specific gravity should be added so that each constituent would perform independently. In this way, the granulated insecticide would act in the mix approximating its performance in the original impregnated granular formulation.

Trial calibrations using such mixtures proved to be highly successful. Therefore each insecticide was weighed out accurately for each

by
George G. Gyrisco and W. G. Evans*
Cornell University, Ithaca, New York

plot and was diluted with pyrophyllite in a ribbon mill to make up 4 pounds. All the plots were treated using such mixtures on August 6. These treatments were followed by heavy rains on August 8, 9 and 10, which amounted to 2.36 inches of precipitation, greatly aiding the rapid penetration of the insecticides into the soil.

On August 11, five days after treatment, grass samples for residue analysis were taken in all the treated plots. A wire frame enclosing 1 square foot was thrown into each plot 4 times and the area enclosed was clipped with a pair of lawn clippers. The sixteen 1 square foot grass samples were composited for each treatment, sub-sampled and prepared for insecticide residue analysis. These residue data, when completed, will be presented in a later paper.

On October 16, four 1 square foot samples chosen at random were dug with a shovel to a depth of 1 foot in each plot and hand sorted for third instar grubs. These data are presented in Table 1.

It is rather obvious from the table that aldrin, dieldrin, heptachlor and chlordane all gave excellent control of the European chafer. Toxaphene while giving some control was unsatisfactory at the concentrations used in this experiment. Dieldrin at the rate of 2 pounds per acre of actual toxicant gave a significantly better kill of grubs than did chlordane at 10 pounds of actual toxicant per acre but this difference is not great enough to be of practical importance. For all purposes one can say that aldrin, dieldrin, heptachlor and chlordane at the dosages used as granular insecticides gave excellent control of the European chafer grub and were about equal in their toxicity.

In comparing the results of granular insecticides with those of conventional formulations of the same insecticides, (see Burrage and Gyrisco, 1952 & 1953) one can readily see that the granular formulation was equal to conventional dust and spray formulations in toxicity and speed of action under the conditions of this experiment. Further work on residual toxicity and work under adverse conditions is necessary before final conclusions can be reached as to the long-term effectiveness of such formulations.

Summary

Granular formulations of aldrin, dieldrin, and heptachlor at the rate of 1 and 2 pounds of actual toxicant per acre, chlordane at 10 pounds and toxaphene at 10 and 20 pounds of actual toxicant per acre were tried for the control of the grubs of the European chafer. Aldrin, dieldrin, heptachlor and chlordane gave speedy and excellent control of the grubs. From a practical point of view there were no differences in the toxicity of these insecticides at the dosages tried. Toxaphene at both concentrations was inferior to the other materials.

Both Attaclay and tobacco were tried as granular bases for the impregnated insecticides. The impregnated tobacco stems having greater bulk were easier to control in applying small rates of actual toxicant per acre using a small hand-operated fertilizer spreader, but even with tobacco stems further dilution of a 2 per cent proprietary formulation was necessary to permit an even application of the toxicant.★★

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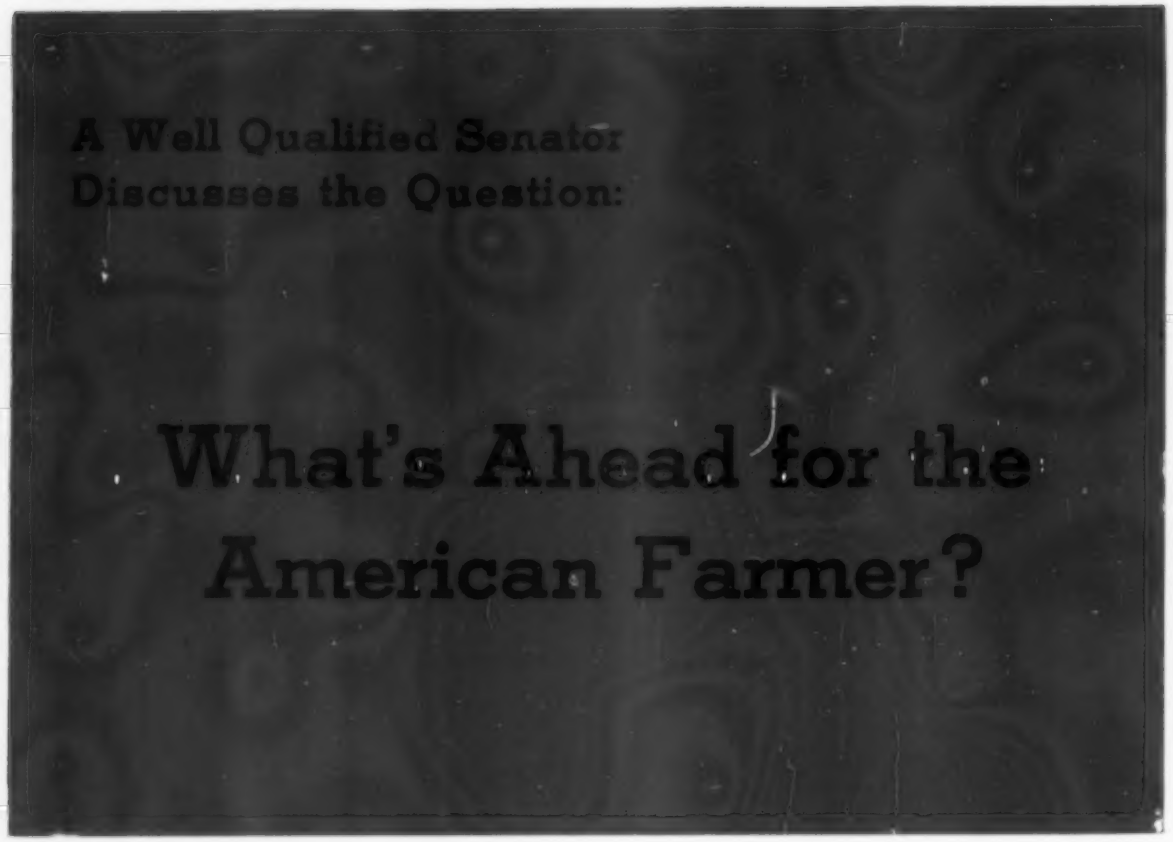
TABLE 1.

Effects of summer soil treatment with aldrin, dieldrin, heptachlor, chlordane and toxaphene upon European chafer larvae populations in pasture sod. Materials applied as granulated insecticides from a hand-operated fertilizer spreader. Hutchby-Cooper Farm, Newark, New York. October 16, 1953.

Material[1]	Act. Tox. lbs./A.	No Grubs Per Cu. Ft.[2]	Per Cent Reduction
Dieldrin	2	1.0	95.7
	1	1.4	94.0
Aldrin	2	2.0	91.5
	1	3.3	86.0
Heptachlor	2	2.9	87.7
	1	4.4	81.3
Chlordane	10	3.4	85.5
Toxaphene	20	11.2	52.3
	10	12.5	46.8
Untreated	—	23.5	—
L.S.D. at 1 per cent level		3.1	
L.S.D. at 5 per cent level		2.3	

1. Applied August 6, 1953.
2. Samples taken October 16, 1953.

* The authors wish to acknowledge the assistance of D. G. Harcourt, A. A. Muka, H. H. Neunzig and M. G. Savos in part of the work reported in this paper.
** Product of Attapulgus Minerals & Chemicals Corp., Philadelphia.



AMERICANS are justly proud of what we call "the American way of life." Our civilization is the envy of the entire world. Our people enjoy the highest standard of living that any people have known. We hear great paeans of praise for the industrial machine that has brought these blessings into being, and we are entitled to boast of our skilled craftsmen, of our assembly lines, of our methods of mass production. We can boast of American labor, for our man produces more than does his counterpart in any part of the world. It is, however, rather unfortunate that industry and its comrades so thoroughly dominate the education, the habits of thought, and the means of communication of the American people that most of them have come to look on our industrial machine as the source of all the good things of this life.

Farmers do not have publicity agents. Therefore, generation after generation of young city Americans grow to manhood unconscious of the importance of agriculture. There is little very real awareness of how completely the very existence of every person, from day to day, depends upon the American farmer. There is little consciousness of the world of organic life and growth upon which farming is based, and the tremendous improvement that has taken place in farming methods.

This ignorance of life on the farm and the importance of American agriculture to the national economy is even manifested at times in the halls of Congress and in the executive branch of the government. Our school books and histories discuss the industrial revolution but they say little of the equally dramatic agricultural revolution. Farming is now an exacting science. It has more than kept pace with the technological developments of industry. The output per man hour of labor on the farms is now more than two and one-third times what it was 40 years ago. Most of this gain has occurred in the last 15 years.

Within the lifetime of many people living today, nearly half of our population was engaged in farming. Despite that, there were occasional shortages of some particular types of food or fiber. Today, less than 15 percent of our total population is engaged in farming, but farming practices have so greatly improved, the development of fertilization and plant-feeding has attained such new efficiency, and we have developed such productive farm machines that though the total population engaged in farming continues to decrease, the output from our farms has vastly increased.

Our people are supplied more food and fiber than any civilization in human history has ever enjoyed. Out of our abundance we have shipped vast quantities abroad and have prevented starvation in other lands. We

*Address delivered at the Fall Convention of The National Fertilizer Association, Atlanta, Georgia, November 16-18, 1953.

by
Hon. Richard Russell
United States Senator from Georgia

hear complaints about the high cost of food—it is well to bear in mind that the farmers' part of the consumers' dollar is shrinking every year, while the cost of food has increased in common with every other commodity on the American market. The cost of food today takes no larger percentage of the average income of the American citizen than it ever has before.

The American farmer and the related industries have made a great contribution to victories in two World Wars. This was accomplished under great difficulties. When we acclaim the mighty machines of war that are produced by American industry, we must not overlook the part played by the American farmer in this war production. Napoleon stated the matter very simply when he said "an army travels on its stomach." Atomic weapons, jet planes, tanks, guided missiles, artillery, all of our great weapons, will prove to be of no avail in any future emergency unless we have ample quantities of food and fiber to sustain those who handle those weapons.

Food and clothing are being used as instruments of foreign policy in the cold war which now grips the world. These commodities have helped to blunt the edge of communist propaganda against the capitalistic system. It is very difficult to influence a man by mere words whose life has been saved by food or clothing produced by free men.

The fertilizer industry is entitled to a salute for its part in this record of increasing production. By research, patient developments, the industry has developed fertilizers to fit different types of soil and the varying plants. By placing a chart that shows increase of farm production alongside one that shows the increased consumption of fertilizer, one will find that the two have kept pace.

Farm Income Down

DESPITE the amazing record of production of the American farmer, his income today is sliding downward. It is sliding downward at a time when the income of every other group in this Nation, every other segment of our population, stands at a new high. That is true whether it is on a per capita basis or considered on a group basis. We know that the national income has reached a new high point this year. While that has been happening, farm income has gone down.

The way it appears now, the net income of the American farmer this year will be a billion and a half dollars less than it was in 1952. This depression on the farm in the midst of prosperity is eating up the capital assets of the American farmer. The Bureau of Agricultural Economics estimates that the total assets of all farmers will be $9 billion less by the end of 1953 than they were on January 1 of this year.

A short-sighted viewpoint is that since only 22 to 24 million people live on the farm, (around 15 percent of our population), the downward trend in farm income will not greatly affect our total economy. However, those figures tell only a part of the story. The Department of Agriculture, through a long and careful study, has developed the fact that about 45 percent of the nation's gainfully employed depend directly or indirectly on agricultural activities and related endeavors. Therefore, when we speak of agriculture, from the point of view of the national economy, we are talking about almost one-half of the entire economy.

Though industry and agriculture occupy different spheres of production, they are actually Siamese twins. One of those twins cannot get sick without endangering the well-being of the other. We have long since learned the lesson of the interdependence of the various segments of our national life. Bitter experience of other depressions has taught us that we cannot maintain a prosperous economy for the entire nation in the face of a sustained decline in income and assets of the farmers. Looking to more recent history, the last great depression started with the American farmer, reached up to those in farm communities and small towns that supplied him, closed his avenues of credit in the smaller banks and, as a creeping paralysis, went through our entire economy until it stopped some of our biggest plants and threatened the very life and existence of our greatest fiscal institutions.

"Free Market" Not Free

LET us examine briefly some of the proposals and suggestions that have been made for dealing with this acute farm problem. There are those who advocate a "free market" for the American farmer, and this slogan has an attractive ring. The American farmer has long fought for a free market for all of America. Going back into the history of the farmers' alliance, the "agrarian rebellion" out of which the Populist Party was formed, you will find that one of the chief aims was to have a free market where farmers would no longer be compelled to buy in a protected market and sell in a world market at world prices. They never were able to achieve that aim. Of all of us, the farmer is the best prepared to get along in a *truly* free economy because he produces the real essentials of life.

But these people do not propose a free economy. They do *not* advocate at the same time the repeal of all tariffs, they do *not* urge the striking down of the minimum wage and hour law, and the taking away of all the subsidies and subventions that are given through the federal government to other groups, so in their view a free market for the American farmer means only repealing all laws that have been enacted in an effort to sustain the income of the American farmer. Such a course can bring us only to national disaster.

There are those who advocate the two-price system—this is worthy of careful consideration. We must find some means of keeping the world market for American agricultural products, and in my opinion the two-price system can be applied to some of our agricultural commodities.

Under the existing law, we have 90 percent mandatory supports on the basic commodities with discretionary powers vested in the Secretary of Agriculture to support commodities that are not deemed to be basic.

Thomas Jefferson said, I believe, that "a bad law well administered is better than a good law poorly administered." In my opinion, the law providing 90 percent supports for the basic commodities will entail no losses whatever to the American taxpayer if it is properly administered. Of course no one would advocate a 90 percent support program for all of the perishable commodities because such a program would be entirely too wasteful. But where controls can be applied, as they can be when approved by two-thirds of the farmers themselves in the case of the basic commodities, proper administration will not result in any loss and we have had very little loss to date.

Soil conservation programs have been a matter of great controversy in the past Congress. Some people call the ACP payments a subsidy to the American farmer. It is my belief that every citizen of this land has a stake in preserving and increasing the fertility of the soil that produces food and fiber for our people.

It is well to remember at this point the figures on the great increase in our population and the fact that there are just so many tillable acres of land to provide the food and clothing for this increasing population. This makes it certain that if our civilization is not to go the way of other great civilizations in history, which crumbled and fell when they became dependent upon outside sources for their food and fiber, it is essential that we conserve the fertility of our soil. It has now reached a point where we have only two and a half acres of soil for each one of our citizens. And I venture to say that if any particular American knew just where it was, to which two and a half acres he must look for his food and for his clothing, and if he realized that his children and his children's children were dependent upon that same two and a half acres and no other plot of land, he would exhibit great interest in seeing that there was not the slightest bit of erosion or wastage to the fertility of that soil. We have done a great deal to repair the ravages of wasteful farming practices and of the erosion caused by wind and by water. We no longer see, hovering over our National Capital, great dust clouds, colored by the fertile soil that feeds and clothes our people.

"What's Ahead for the American Farmer?" I am sure that anyone even indirectly interested in agriculture, has been impressed by the confused clamor of voices that have arisen in the past 12 months as to the proper course to pursue. I endeavor to stay reasonably well informed on the courses of Congress that relate to agriculture but my crystal ball is not good enough to make any definite predictions as to what will grow out of the next Congress. I do know this, however. I know that it is essential to the national welfare that some specific, definite and concrete program be brought forward at the earliest possible date to end the present uncertainty that is contributing to the slide of farm prices.

I do believe that the next Congress will maintain the Agricultural Conservation Program at about the same level that we know today. That, of course, is considerably below the appropriations that have been made for a number of years. In only one year out of the past 15 has the ACP program been below the sum of $250 million. This year it is $195 million. We have introduced a new element into this program: the so-called pilot-test conservation districts in the smaller watersheds. That is a matter of great interest in many areas where there is great conflict between the big dam and the little dam as a method of controlling floods. That has been debated vigorously for many years. I believe the Congress will appropriate, for next year, about the same amount for conservation purposes as is carried in the present appropriation bill—$95 million.

We have seen efforts made to change the nature of the practices for which conservation payments could be made. The present Secretary of Agriculture has undertaken to prohibit any payments for what are called the "recurring practices." The Congress disapproved of that program in the report of the Senate Committee on Appropriations. There was set forth the Senate's idea of a program, and a direction and a mandate to the Secretary of Agriculture

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Facts About

Spray Residues

By P. J. Chapman*

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OCCASIONALLY someone comes out with a charge that people are being poisoned wholesale through exposure to pesticides or by consuming foods that carry pesticide residues. Such statements are usually long on claim, short on fact. Because of their sensational nature, however, they receive wide publicity.

It is difficult to counteract the harm done by such reports. Alarmists, especially those of the professional type, are well aware of the attention-getting advantage that sensational claim has over sober fact. And yet these stories should not be allowed to go unanswered. The general public is entitled to have not only "the other side of the question" but the overall facts on the situation.

People should be made more aware than they apparently are of how dependent we are on pesticides to maintain our present high levels of health and food production. Without pesticides we would not be able to produce sufficient food to feed this nation. In spite of using pesticides, we still sustain insect losses estimated at $5 billion annually.

Mosquitoes, flies, lice, fleas, mites and ticks of various kinds are carriers of some of man's most dread diseases. These include malaria, yellow fever, typhus, bubonic plague, cholera, dysentery and many others. DDT and other new materials have given marvelous results in controlling these diseases in plague-ridden spots of the world. The principle used is: control the disease by eliminating its pest carrier. In this connection DDT alone is credited with having saved 5 million lives and with having prevented 100 million serious illnesses, since the chemical was introduced in 1942.

In view of the foregoing, isn't it time we thought more of pesticides as boons of mankind rather than as imagined health hazards?

Human exposure to pesticides is of two types. On the one hand, there are persons who may be heavily exposed while manufacturing or handling pesticides in the course of their daily work, or while treating crops. All of us as consumers make up the second group. Exposure here consists of eating food which may in some cases bear traces of spray residues. Of the two, the pesticide worker and the grower are obviously subject to the greater danger if real hazards truly exist.

Most pesticides are toxic substances. No one denies this fact. They would be of little value in insect control if they were not toxic. Fortunately, some pesticides are much more toxic to pests than to man. More and better examples of these safe materials are under development.

What, then, are the hazards to growers in their use of pesticides for insect, disease and weed control? Most growers are aware that pesticides must be handled with care. They know further that some of them are downright dangerous to use. Actually, farmers have a fine safety record in the use of pesticides. Dr. W. L. Popham, Assistant Chief of the U. S. Bureau of Entomology and Plant Quarantine, recently had the following to say on this point: "Although a billion pounds of insecticides are manufactured in this country annually, authentic records of ill effects from their use when properly applied are almost completely absent."

Some grower fatalities have been caused by pesticides. But such instances are rare and can almost certainly be ascribed to gross carelessness in their use.

Tolerances Needed

TURNING now to the spray residue question as it concerns the consumer. Everyone would be happy if even the barest traces of pesticides could be kept out of all food. Fortunately, this is possible with many foodstuffs. With others it is not presently possible to eliminate all traces of residues. The only practical means of meeting this situation is to fix safe tolerances. There are many precedents for this practice.

To say that a chemical is toxic is not to say that it presents a hazard if ingested in minute amounts. That is an important distinction. For years we have been eating foods that contain small amounts of added chemicals, which if taken in excess, would be harmful. Some examples are mold inhibitors, bactericides, antioxidants, emulsifiers, preservatives, etc. As

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*This article appeared originally, in a slightly different form, in the October 1953 number of the New York State Horticultural Society *News Letter*.

NEW MATERIALS AND METHODS FOR

Fruit Disease Control

BEFORE World War II, the fruit grower had relatively few compounds for use in the control of fungus diseases. In the years since the war ended, the situation has changed radically, and at present there is a rather imposing list of organic materials available.

These compounds are excellent fungicides but with each passing season's experimental work we learn more and more about their virtues and discover some of their limitations. None presently available is a universal fungicide. The following is a current appraisal of these various organic spray materials; a review of the more "up to the minute" subject of antibiotic materials; and upon some of the virtues and drawbacks of the rapid methods of spraying that are in vogue today.

FERBAM is still the logical material for the control of the cedar apple rust fungus, the pear scab fungus in the Pacific Northwest and the pear leaf blight fungus throughout the country.

Used alone or combined with sulfur it has been widely tested for the control of the apple scab fungus, but the trend appears to be away from ferbam for this purpose in the summer sprays on apples. Some fruit growers feel that fruit sprayed with ferbam develops prominent lenticels. At any rate, most of us will agree the lenticels are more noticeable, but this may be due merely to the fact that particles of the black residue lodge in the lenticels. Incidentally, experiments at the Boyce Thompson Institute Yonkers, N. Y., with "tagged" ferbam have shown that at least the iron component of this compound is absorbed and translocated throughout the trees.

ZINEB (zinc ethylene bis dithiocarbamate) is a carbamate that is finding increasing use in fruit pathology. It is quite effective against the pear blight bacterium. The present interest in the possible control of fire blight by antibiotics has focused attention upon zineb as a possible alternative material.

NABAM (disodium ethylene bis dithiocarbamate) is another dithiocarbamate that is being tested in fruit disease control work. The sodium salt sold is not used alone but is combined in the spray tank with zinc sulfate (1 quart of nabam plus 8 ounces of zinc sulfate). The resultant chemical reaction gives an end product similar to zineb. Preliminary work in New York indicated that this material is of some value as a substitute for copper sprays in the control of the cherry leaf spot fungus.

ZIRAM (zinc dimethyldithiocarbamate is a dithiocarbamate that has been available almost as long as ferbam. Experiments by J. C. Dunegan in Arkansas and Missouri some 10 years ago indicated that this material could be used for the control of the apple blotch fungus; Dr. J. R. Kienholz, has used it quite extensively in Oregon for the control of pear scab fungus.

MANZATE (manganese ethylene bis dithiocarbamate) is a more recent introduction. Spray experiments to evaluate this compound thoroughly are still in progress. It is of some promise for use on peaches according to the current experiments.

CAPTAN (N-trichloromethylthio tetrahydrophthalimide), a very complex organic compound containing sulfur, has been tested experimentally for a number of years, but its widespread commercial use dates from 1951. In 1952 it proved to be an efficient yet bland material. Many commercial growers in the eastern fruit sections reported that fruit sprayed with this compound had a smooth glossy finish. However, some unfavorable reports also came to light. Captan was found to be relatively ineffective against the cedar apple rust fungi. It failed to control sooty blotch and some growers reported injury to the leaves and fruit of the Red Delicious variety and its color sports. In 1953 D. H. Petersen, used this material on peaches in South Carolina. Control of the peach brown rot fungus appeared to be satisfactory but in split schedules using sulfur in the early sprays and captan six, four, and two weeks before harvest, there was a marked increase in the incidence of the peach scab fungus. These results suggest the possibility of an unfavorable interaction and will be investigated in more detail during the coming season.

CLYODIN is the newly coined name for the compound more commonly known as Crag Fruit Fungicide, or Crag 341 SC. This liquid glyoxalidine acetate preparation is coming into more general use as a fungicide for apples and has been used experimentally on peaches. However, in 1953 tests glyodin caused some injury to peaches in South Carolina. Glyodin, of course, continues to be used as a substitute for bordeaux mixture for the control of the cherry leaf spot fungus. The material is also available under the code number 341B as a powder.

By John C. Dunegan

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DICHLONE is another unfamiliar coined name that has been assigned to the compound known for many years as Phygon (2,3,dichloro-1,4-napthoquinone). Use of dichlone by J. C. Dunegan in 1944 showed that organic compounds could be used to control the apple bitter rot fungus. This was the first indication that we could hope to avoid the widespread copper injury attendant upon the use of bordeaux mixture in the cover sprays. Further studies with dichlone show that it is apt to cause injury to apple leaves and fruit when used in the central and southern portions of the apple belt. However, it has been used very effectively for the control of apple scab in Maine.

PHENYL MERCURY COMPOUNDS are all extremely toxic to the spores of the apple scab fungus. They are excellent eradicative materials but have little or no residual action and during periods of prolonged rainfall fail to control the scab fungus. This weakness was amply demonstrated in the East in 1952 and commercial practice is turning to combinations of phenol mercury compounds with ferbam, sulfur, captan, glyodin, or dichlone. These mixtures take advantage of the eradicative action of the mercury compounds and add to it the protective action of the other fungicide. Combinations such as these appear to be among the most effective substitutes available for lime sulfur for use at the very beginning of the season.

In 1945, the first commercial test of DDT for codling moth control in an apple orchard was observed in Delaware. Results showed no damage to the fruit and control of the pest.

Antibiotics for Plant Disease

ENTOMOLOGICAL studies have come a long way since 1945, but an open outlook seems to show that very possibly we are at the beginning of another era. This time the control of bacterial diseases of plants instead of insects is the goal. The use of antibiotic materials for the control of pear blight and peach bacterial spot is among the early such applications, and best illustrated by the brilliant results obtained in 1953 by R. N. Goodman with streptomycin and terramycin in Missouri. Similar results were obtained in Ohio by H. F. Winter and H. C. Young. These experiments suggest the possibility that the ravages of pear blight on susceptible varieties of apples can be prevented or at least reduced to the minimum. Experiments at Hood River, Oregon, and at Marysville, California, on the very susceptible Bartlett pear likewise are most encouraging. In 1954, these antibiotic materials will very likely be tested in many parts of the country for the control of pear blight. Much experimental work on the proper dosage rates, timing of the applications and related problems still must be solved. Likewise the economic problems must be surmounted, for at present these antibiotic materials are still quite expensive. However, as their value is conclusively demonstrated, American industry will develop methods for the production of agricultural antibiotics that will bring costs down to a reasonable level.

While most of the work published this season deals with the control of the pear blight bacterium, we have not overlooked the possibility that antibiotics might offer a solution to the difficult peach bacterial spot problem. At Plant Industry Station, Beltsville, Maryland, R. A. Wilson and R. N. Morris, and J. C. Dunegan noted during the past two seasons a marked reduction in the rate of leaf fall following the introduction of terramycin into the trunks of experimental peach trees. Tests to date have been on a very limited scale, but the results are so encouraging that extensive tests in commercial orchards are planned for 1954. It has been demonstrated that terramycin or some product from it is readily translocated throughout bearing peach trees (7 years old). A reduction in severity of bacterial spot on the leaves and fruit has accompanied the reduction in leaf drop.

Actidione has also been used successfully for the control of the cherry leaf spot fungus, an unusual role for antibiotic materials since they generally are not effective against fungi. Likewise, thiolutin has been reported to be effective against the black rot fungus in Delaware.

It is becoming increasingly evident that these antibiotic materials are absorbed and translocated by the plants. It is much too early to attempt an evaluation of the effect of these materials in their role of internal therapeutants. If they continue to fulfill the promises indicated in the 1952 and 1953 experimental results, they may be of untold value. The age of miracles indeed is not over!

Materials and Methods

THE use of spray materials in concentrated form carries with it the very definite responsibility that each tree receive the proper amount of fungicide. The forward motion of the machine and the rate of delivery of the pump must be correlated to achieve this end. If the machine is properly operated, there is no reason why satisfactory results cannot be

(*Continued on Page* 120)

What are the U. S. Requirements for

Cotton Insecticides?

PROFITABLE production of cotton often involves the timely use of effective insecticides to control the boll weevil and other cotton insects. Research is continually improving methods and procedures for utilizing insecticides more effectively. As a result of this research, insect control has been brought within the economic reach of cotton growers generally.

Damage by Cotton Insects

THE cotton plant is affected by many kinds of destructive insects. Although the boll weevil is the most destructive of these pests over most of the Cotton Belt, certain caterpillars, sucking bugs, plant lice, other insects and spider mites add to pest control problems wherever cotton is grown in the United States. The Bureau of Agricultural Economics, United States Department of Agriculture, has published figures for the years from 1909 to the present, showing the estimated reduction from full yield of cotton due to a number of factors. Those data that relate to boll weevil attack and to moisture conditions in the Cotton Belt are shown in Fig. 1 (P. 42). Data showing the reduction in yield in cotton Belt States due to boll weevil, other insects, and deficient moisture are given in Table 1 for the years 1938 to 1952 inclusive, also available data of this type for the western irrigated cotton area.

The boll weevil has caused about 76 percent of the reduction in yield of cotton that was due to insects in the cotton belt since 1909. It reduced the cotton yield by over 30 percent in 1921 and from 15 to 20 percent in some seasons since that year. Average reduction since 1909 has been about 10 percent for the boll weevil and nearly 14 percent for all insects. Peak years of boll weevil damage have occurred every three

TABLE 1.

Percentage reduction from full yield of cotton by specified causes, 1938-52.

Year	Cotton Belt States			Western irrigated area	
	Boll weevil	Other insects	Deficient moisture	Insects	Climatic factors
	Percent	Percent	Percent	Percent	Percent
1938	9.9	4.2	6.8	—	—
1939	8.7	2.2	10.1	—	—
1940	6.5	1.9	5.5	—	—
1941	15.4	4.8	3.3	—	—
1942	8.0	4.0	3.6	—	—
1943	6.1	2.0	12.5	—	—
1944	3.9	2.3	7.5	—	—
1945	10.2	2.6	4.0	7.8	9.9
1946	13.0	2.1	7.4	2.9	9.8
1947	7.6	1.6	12.0	4.5	7.8
1948	5.0	1.6	8.8	2.6	9.8
1949	17.5	1.7	2.1	3.8	7.9
1950	22.6	4.3	3.2	3.0	5.5
1951	6.7	2.7	15.5	5.4	9.4
1952	5.0	1.7	21.8	4.7	8.4

Source: U. S. Bureau of Agricultural Economics.

by
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to six years since 1916, with an average period between peaks of 4.8 years.

Stated in another way, reduction in yield of as much as 13 percent because of weevil activities in the entire cotton belt has occurred in eight seasons in the last 30 years. Weevil activity of this degree extended over three seasons from 1927 to 1929 and over the two years 1949 to 1950. The remaining three years when yields were reduced as much as 13 percent were 1932, 1941, and 1946.

The reduction in cotton yield due to boll weevils for the period from 1938 to 1952 inclusive, was greatest in those states from Virginia to Florida and westward along the Gulf to Louisiana. In this area the 15-year state averages ranged from 11.8 to 16.2 percent (Table 2). In Tennessee, Arkansas, Oklahoma, and Texas the 15-year average reduction was from 3.7 to 8.5 percent.

During the fifteen-year period from 1938 through 1952, the acreage of cotton harvested each year averaged over 22,000,000 acres. This immense acreage was exceeded only by that for corn, wheat, oats, or all hay. Because serious insect infestations in some years may cause the entire loss of the cotton crop in untreated fields, cotton insecticide consumption may at times be exceedingly heavy. In other years, the crop may be so reduced by weather conditions unfavorable to both the cotton plants

TABLE 2.

Average percentage reduction from full yield of cotton from boll weevil and maximum annual reduction for 15-year period 1938-52 inclusive, by States.[1]

State	Average	Maximum[2]	State	Average	Maximum[2]
	Percent	Percent		Percent	Percent
Virginia	13.6	63	Alabama	14.1	33
North Carolina	15.1	54	Mississippi	11.8	27
South Carolina	14.1	31	Arkansas	7.7	26
Georgia	16.2	35	Louisiana	12.0	27
Florida	13.7	22	Oklahoma	8.5	29
Tennessee	3.7	19	Texas[3]	6.6	12

1 Missouri not included because data are incomplete; average reduction in period 1945-52 was less than 0.4 percent.
2 The maximum annual reduction occurred in 1950 except in Georgia and Mississippi where it occurred in 1949.
3 Western Texas is not included because it is out of the boll weevil area.
Source: U. S. Bureau of Agricultural Economics.

TABLE 3.

Effect of number of applications of pesticides in South Carolina on yield of lint per acre.

Number of Applications	Yield, pounds per acre			Number of acres surveyed for 1952 data
	1950	1951	1952	
0	93	273	220	192,601
1-3	184	348	263	331,258
4-6	280	423	302	216,982
7-9	375)	510	385	77,284
10 or more	466)			

Source: South Carolina Agricultural Extension Service.

and the associated insects that consumption of cotton insecticides will be relatively light. Despite a growing tendency toward more general usage of cotton poisons, consumption of these materials in the boll weevil area from Texas and Oklahoma eastward was more than 40 percent lower in 1952 than in 1951, largely because of weather conditions unfavorable to the crop.

Figure 1

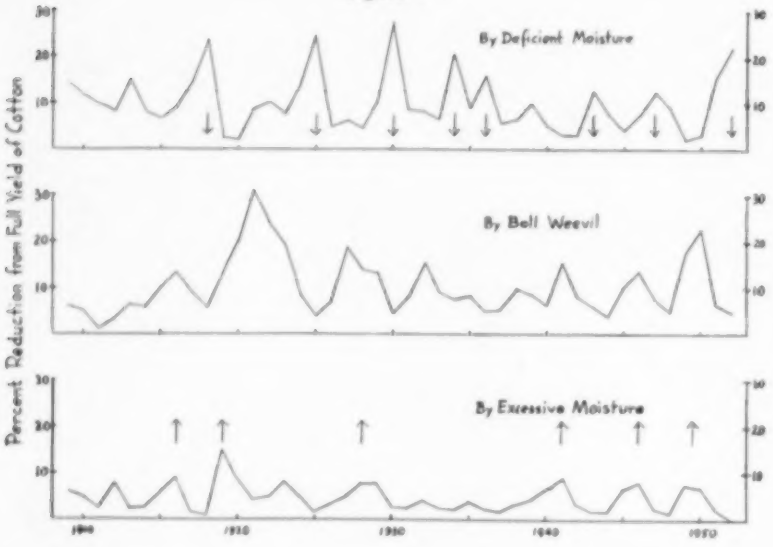


TABLE 4.

Effect of number of treatments on yield of lint in 1951 series of five-acre contest plots in Mississippi.

Number of applications	Pounds of lint per acre
0	330
1-3	658
4-6	788
6-8	851
8-10	966
10 and over	1,138

Source: Mississippi Agricultural Extension Service.

TABLE 5.

Estimated Quantities of Major Insecticides Used on Cotton, 1949-50 to 1951-52.[1]

Insecticide	1949-50	1950-51	1951-52
	pounds	pounds	pounds
Benzene hexachloride (gamma content)	5,500,000	6,300,000	5,000,000
DDT	16,200,000	15,300,000	11,500,000
Aldrin, chlordane, dieldrin, heptachlor, and toxaphene	36,400,000	56,400,000	28,000,000
Calcium arsenate	33,600,000	27,000,000	10,300,000
Parathion	920,000	1,500,000	n.a.[2]
Sulfur, ground	109,100,000	81,700,000	n.a.
Tetraethyl pyrophosphate (100%)	200,000	358,000	n.a.
Aramite, EPN and nicotine sulfate	n.a.	430,000	n.a.

1 Based primarily on estimates from extension entomologists in cotton states as to the qantities of each formulation used.
2 Figure not available.

Benefits from Insecticides

MANY factors may assist in increasing crop yields. However, ample evidence exists that by itself, application of insecticides to cotton in accordance with recognized insect control practices, increases yields. Such evidence from South Carolina and Mississippi is given in Tables 3 and 4. In a North Carolina series of twenty large-scale comparisons made in 1952, the average yield was increased from 377 pounds per acre in untreated fields to 485 pounds in treated ones. The overall yield for surveyed acreage in the same state (about 78 percent of the total area in cotton) was 421 pounds per acre for treated fields and 322 pounds for untreated ones.

The profit which can be derived from proper use of insecticides to control insects on cotton has been demonstrated in community-wide experiments in central Texas. In 1949, nineteen adjoining fields in one community were dusted or sprayed with insecticides properly timed according to the particular types of insects in each field. Fourteen fields in another nearby community received no insecticide treatments, but all other factors in the management of the crop were the same as those in the treated fields. The average yield in lint cotton was 415 pounds per acre from the treated fields as compared with 178 pounds from the untreated fields. The net profit from increased yields of lint cotton was $54 per acre. A similar large-scale demonstration carried out in 1950 gave an average net gain based on increased yields of lint cotton of $74.84 per acre.

Cost of Application

OKLAHOMA growers in 1952 made between 2 and 3 applications of poison to 337,639 acres at a cost of $812,828. Their average cost per acre accordingly was $2.41. In a contest involving five-acre fields

of cotton in Mississippi one contestant reported his cost of applying 10 dustings to be $11 per acre while another spent $35.80 per acre to make 17 applications.

The cost of application, exclusive of materials, has been estimated at 50 cents an acre for dusting and 75 cents for spraying. The overall average cost each year from 1950 to 1952 to the cotton growers of the United States for applying insecticides to their crop was probably at least $80,000,000.

Volume Applied to Cotton

SINCE World War II, the commercial development for agricultural purposes of organic insecticides such as DDT, benzene hexachloride, toxaphene, aldrin, dieldrin, and heptachlor revolutionized the control of cotton insects. Growers became less dependent upon the single important cotton insecticide, calcium arsenate. The control of numerous destructive pests of cotton not heretofore controllable was made possible, and the volume of special mixtures formulated ready to apply increased phenomenally. For instance, 1942 was a year of high calcium arsenate consumption, disappearance of this chemical at the producers' level that season amounting to 67,250,000 pounds Of this quantity, 89 percent went to the Cotton South. By 1950, 381,000,000 pounds of formulated dust mixtures (including 33,400,000 pounds of calcium arsenate) and 5,260,000 gallons of spray concentrates were used on cotton in the United States. Only 7 percent of the quantity used that year was calcium arsenate, 36 percent being benzene hexachloride and 57 percent other chlorine-containing organics.

Overall consumtpion of formulated cotton poisons has remained at a relatively high level since 1950, subject to the normal fluctuations of boll weevil populations (Table 5). In 1951, consumption in the boll weevil area was 24 percent higher than in 1950; in 1952 it was 27 percent lower; and in 1953 it rose again somewhat. As explained later in this paper, consumption on cotton is not necessar-

(*Turn to Page* 111)

Figure 2

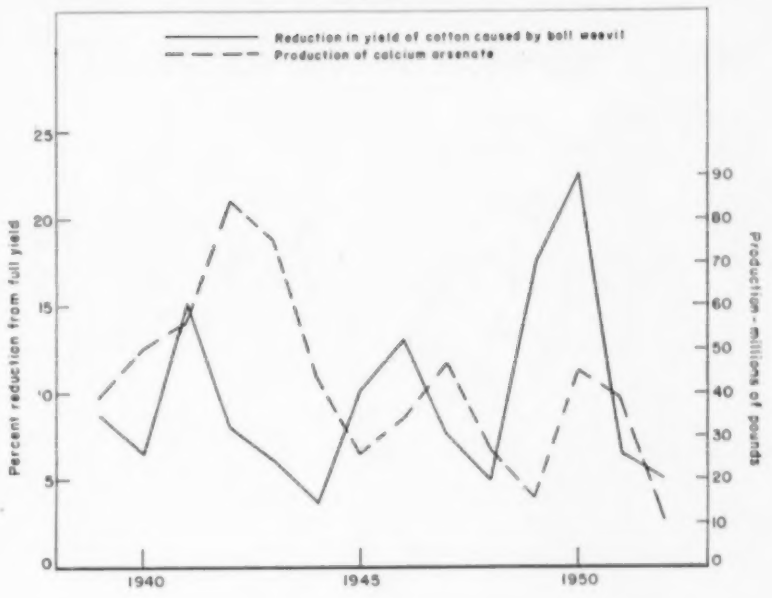


TABLE 6.

Consumption of Full Strength Dusts and of Spray Concentrates for Cotton Insect Control in the Boll Weevil Area, 1949-52.[1]

	1949	1950	1951	1952
Total Consumption of boll weevil type cotton poisons, millions of pounds field strength dust equivalent	161	502	622	365
Total field strength dusts actually used as such, millions of pounds	153.4	349.9	304.2	234.2
Percent of total applied in liquid form	4.7	30.3	51.1	36
Total liquids, million of gallons	0.265	5.26	11.82	3.93

1 Figures are based on estimates made by the extension entomologists in each State.

TABLE 7.

Percentage of cotton insecticides applied as sprays in boll weevil area by States, 1950-52[1]

State	1950	1951	1952
	Percent	Percent	Percent
North Carolina	2.5	16	16
South Carolina	7	14	21
Georgia (est.)	(8)	(10)	n.a.[2]
Tennessee	34	(50)	—
Alabama	10	7.5	6
Mississippi	38	35	30
Arkansas	17	(20)	40
Louisiana	15	29	25
Oklahoma	26	70	43
Texas	49	86	57
Whole area	30	51	36

1 Based on estimates made by the extension entomologist in each State.
2 Not available.

Tennessee Valley Authority as "Experiment Station" for New

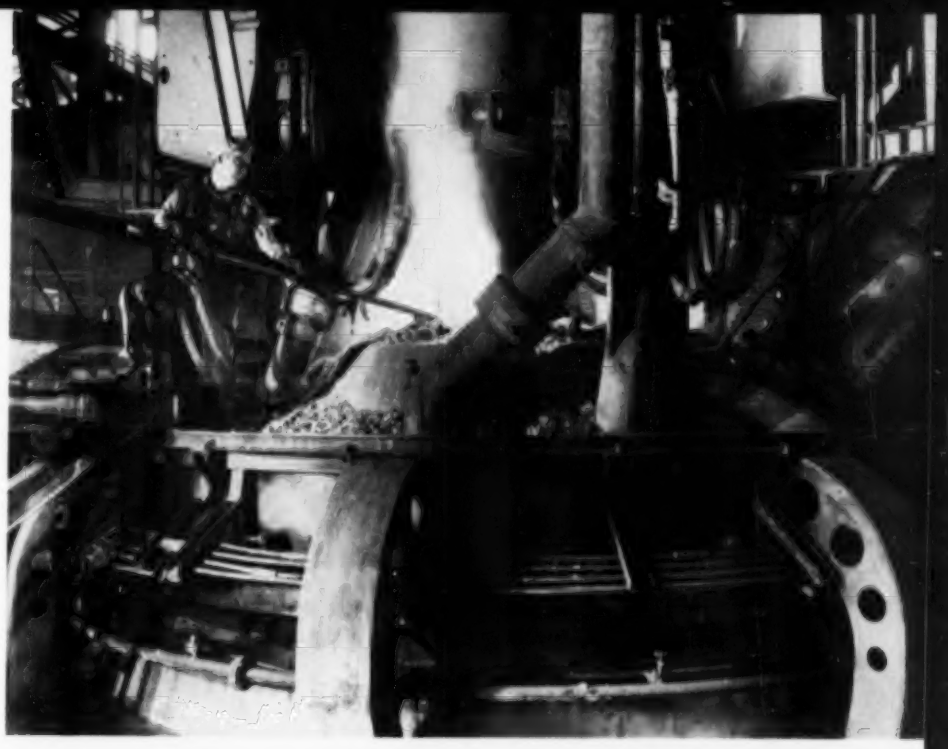
Fertilizer Mfg. Techniques

WITH the potential and actual demand for more and more fertilizer materials constantly increasing, the industry is constantly on the alert for improved methods of manufacturing. It seems natural, therefore, to look into contributions made by the Tennessee Valley Authority during the past decade to see what practical ideas have been generated in this vast project owned and operated by the Federal Government.*

During the past two decades of activity, TVA has investigated and developed several processes for the manufacture of fertilizer materials. They include the development of electric furnace phosphorus processes; the nitric phosphate processes for manufacturing compound fertilizers; continuous superphosphate mixing methods; processes for the production of fused phosphate fertilizers; manufacture of ammonia and nitric acid;

Above: Huge superphosphate storage building from east end. Supporting steel girders are on outside to prevent corrosion from within.

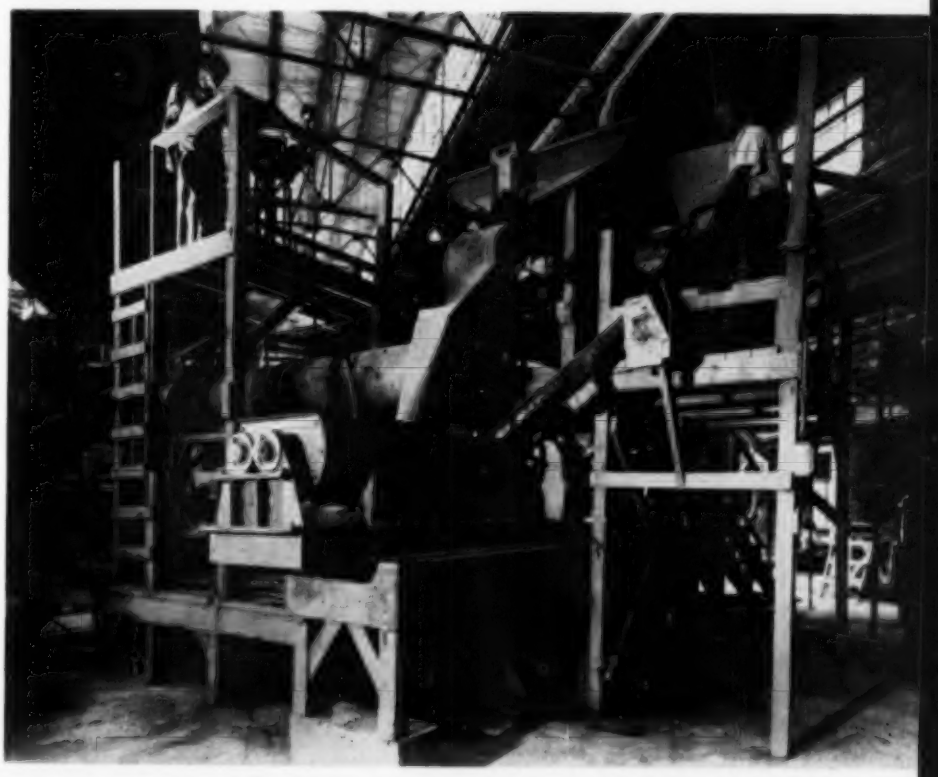
Below: Pressure-type nitric acid plant at TVA plant, Wilson Dam, Ala.



Top of the rotating electric phosphorus furnace. This type of furnace makes possible use of low-grade ore, thus may extend phosphate reserves in the U.S.

new methods for ammonium nitrate production; processes for manufacture of diammonium phosphates; studies on production of enriched superphosphates; and new methods of ammoniating fertilizer mixtures. Its possession of facilities for experimentation, plus cooperation of the fertilizer industry of late years, has brought about the development of manufacturing techniques which are proving to be of increasing interest to the fertilizer trade.

The developments which to date have proven to be of most interest to the fertilizer industry and which have found or are finding commercial application include the nitric-phosphate processes for making complete fertilizers, the continuous mixing method for triple superphosphate and the development of equipment for the continuous ammoniation



Dryer and mixing equipment in the nitric phosphate pilot plant.

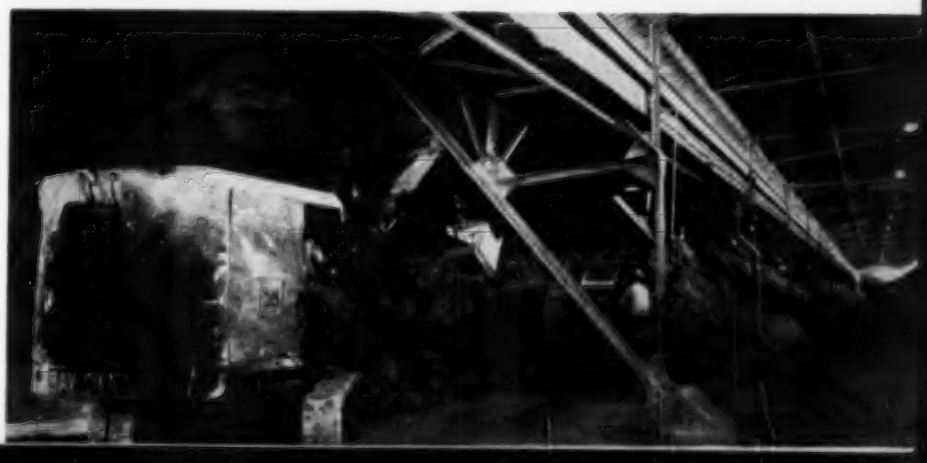
of fertilizer mixtures. Other process developments may find wider use in the future.

Nitric Phosphate Processes

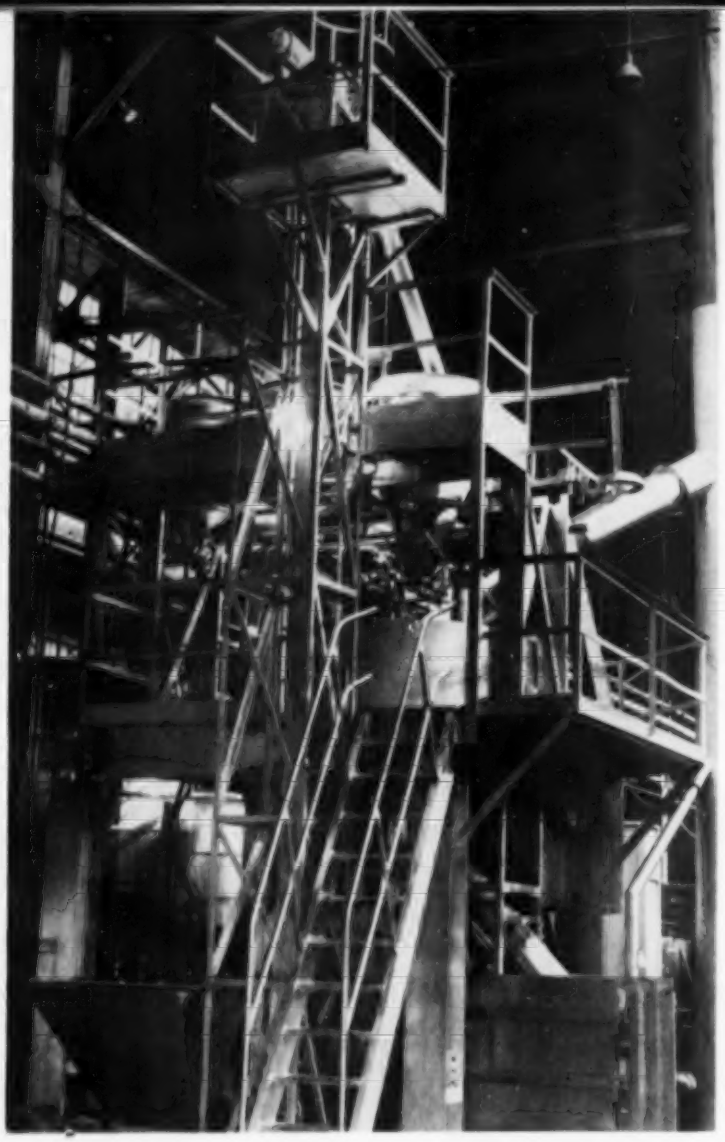
WHEN sulfur became scarce two years ago, unusual interest was being directed toward the use of nitric acid as a substitute for sulfuric acid in the acidulation of phosphate rock.

Although processes involving the use of nitric acid are not new, widespread attention was focused on TVA's work along this line because of the lack of sulfur which loomed large then. It has been known for

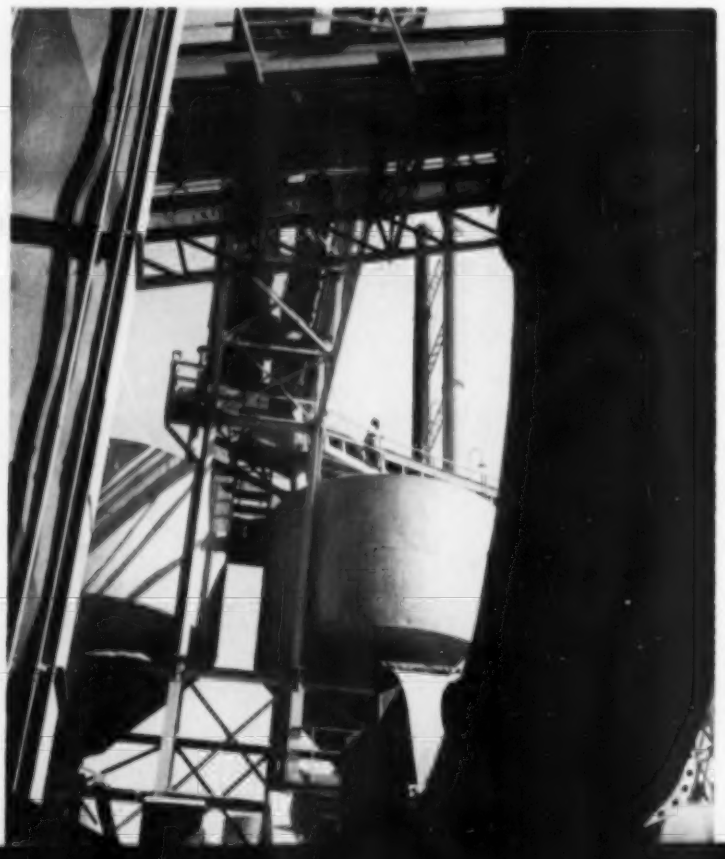
*TVA was established by Congress in 1933. Two World War I surplus nitrate plants at Muscle Shoals, Ala., both obsolete, neither in operation, were turned over to the new agency with authority to modify these plants for fertilizer manufacture. Thus, these once-idle plants have been converted by TVA into a national laboratory for improved fertilizers in peace time and the production of munitions in war time. According to Gordon R. Clapp, chairman of the TVA board of directors, its fertilizer program is not conducted commercially. Rather, the program "as far as fertilizers are concerned, is one of research, experiment and demonstration; its purpose is to develop better methods in production, distribution and use of fertilizers," he stated recently.



Digging superphosphate from storage-curing piles at TVA.



Pilot plant for the manufacture of enriched superphosphate.



Overhead belt conveyor and storage bins for loading fused tricalcium phosphate onto railroad cars. To gain perspective of size, note man on catwalk in center of photo.

many years that simple acidulation with nitric acid does not yield a fertilizer material with satisfactory properties, since the product contains calcium nitrate and is extremely hygroscopic. It is also corrosive and cannot be dried because of its instability.

Thus, beyond previous work done in Europe, further development was regarded as necessary by the TVA, since little detailed information on methods and equipment was available. After intensive study, four processes were found to be most promising. These were:

I. Extraction of rock phosphate with a mixture of nitric and phosphoric acids, followed by ammoniation, addition of potassium chloride and drying. Typical grades: 11-22-11 and 14-14-14.

II. Extraction with a mixture of nitric and sulfuric acids followed by ammoniation, addition of potassium chloride and drying. Typical grades by this method: 14-14-0 and 11-11-11.

III. A method similar to No. 2, except that the required amount of sulfate is derived from potassium or ammonium sulfate, rather than from sulfuric acid. Typical grades are 12-12-12 and 14-12-9.

IV. Extraction with nitric acid, ammoniation, treatment with carbon dioxide and additional ammonia, addition of potassium chloride and drying. Typical grades, 14-11-11; 17-13-0; and 12-12-12.

Continuous Super Mfgr.

LOWER initial and maintenance costs, lower operating labor and power requirements in addition to better mixing and process flexibility are claimed to result from the continuous-mixer process as compared to the batch-type mixing method. TVA developed for production of concentrated superphosphate, its own mixer,

Ammonium Nitrate crystallization plant, showing bagging and product handling equipment.

which mixes from 17 to 50 tons per hour. In plant operation, finely-ground rock phosphate is introduced at a controlled rate into the center of the cone and the metered phosphoric acid is delivered through four nozzles located on the inside surface of the cone.

Fluid acidulate discharges onto a rubber conveyor belt where it solidfies. A rotary cutter at the far end of the belt distintegrates the fresh superphosphate before it is removed for pile curing and storage.

With this successful method of continuous operation well developed, the question arose whether a similar process might be used in the continuous production of normal superphosphate.

Pilot plant studies showed that it was more difficult to mix rock phosphate with sulfuric acid in the funnel that it was to mix rock phosphate with phosphoric acid. Whereas

View showing Manierre loader receiving bags of superphosphate from slot conveyor in the ammonium nitrate plant.

in the manufacture of superphosphate, several mixers had proved satisfactory, only one design worked well in mixing normal superphosphate.

This consisted of a cone with four acid inlets spaced 90° apart around the sides. Under pilot plant conditions, this was operated successfully at a mixing rate of about one ton of superphosphate per hour.

The fresh material, made by acidulating Florida phosphate rock with sulfuric acid in the range of commercial mixing ratios, after discharging onto a belt, was conveyed either to a den located under one end of the belt near the mixer, or allowed to solidify on the belt and thus conveyed to a rotary disintegrator placed at the far end. From this point, the superphosphate was charged to a bin where it was cured under simulated pile conditions.

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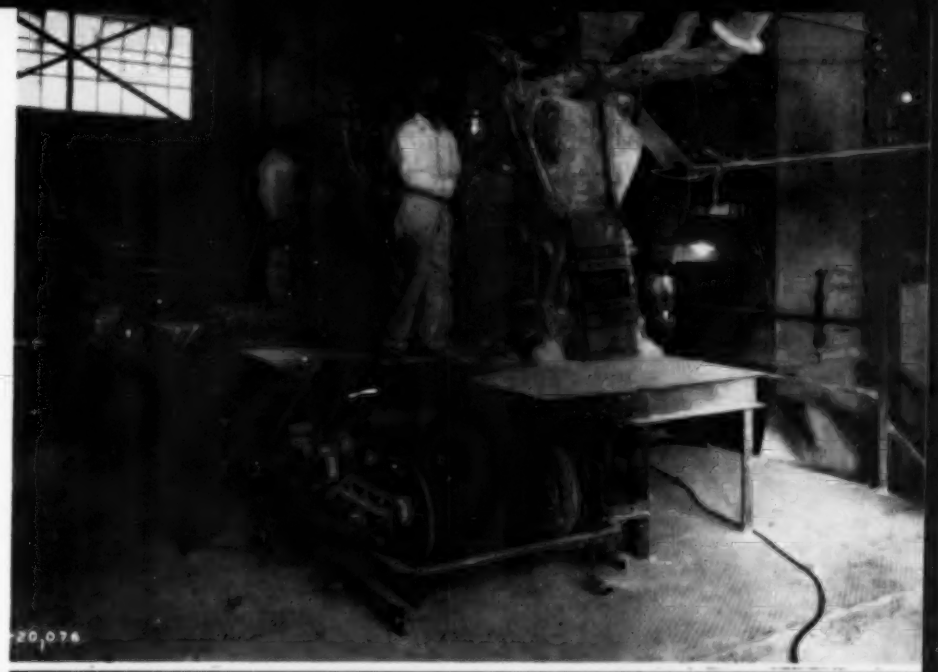
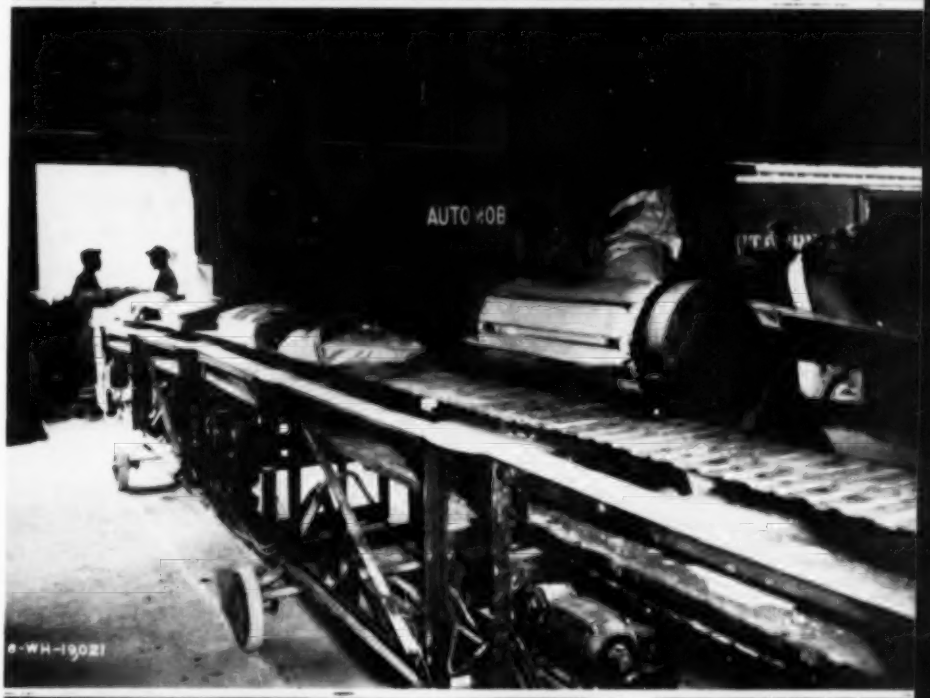
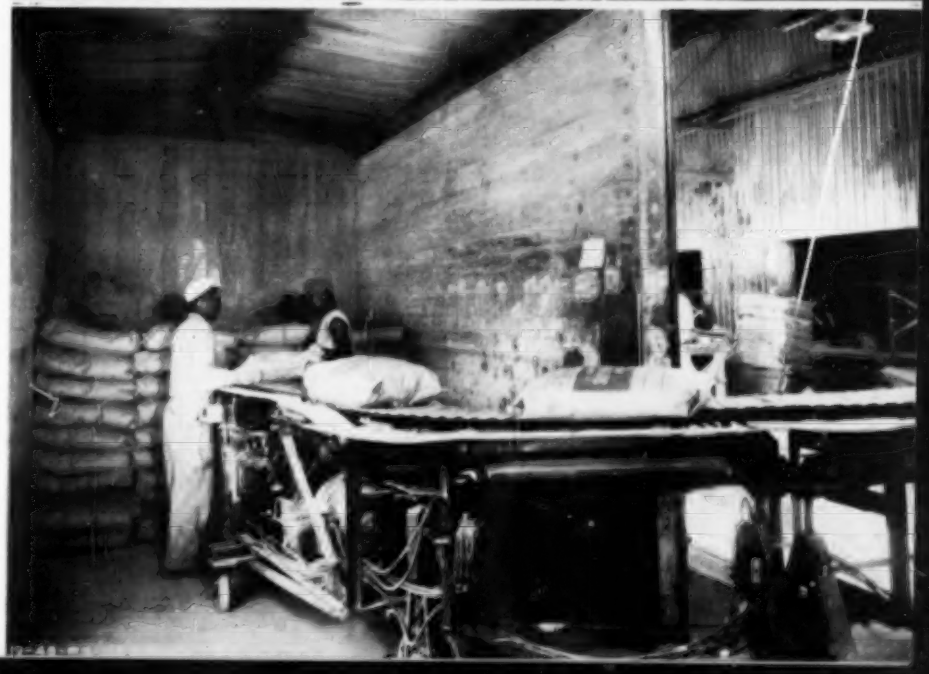
View in one end of box car showing men stacking bags of fertilizer from loader.







Legislative Control in Entomology

AT first glance, it would appear that research and legislation are widely separated. Such a condition was true not many years ago in the field of entomological research. Today, however, a trend has fast developed so that research in entomology as well as all research in the broad field of agricultural chemicals is not only influenced, but, in fact, is subject to legislative and regulatory controls which will decide the rate of progress in entomological research and agricultural chemical production and use.

The path of much scientific research historically has not been a smooth one, particularly in fields of endeavor where public acceptance has been subject to serious doubts. Innumerable examples could be given, such as Lord Joseph Lister's problems with antiseptic surgery, the fight against vaccination, the difficulties of Louis Pasteur, the rioting in our own streets when automobiles were first introduced, and even laws preventing the use of bathtubs because people slipped and fell in them.

Paradoxically, however, the introduction of pest control chemicals met little initial resistance from the public. Probably far less resistance was shown than to many of the innovations introduced in medicine, mechanization and other phases of technology.

But, like an afterthought, slowly but certainly there is a growing trend to build up a fear of the use of these materials on our growing crops. The public is becoming unduly fearful due to the efforts of would-be scientists unacquainted with the tremendous amount of scientific research behind pesticides and the legal protection *now in existence* which assures the American public a safe food supply. No other country in the world enjoys as much variety, quality and safety in their foods as does America.

You and I know that agricultural pesticides can be used effectively without endangering the public health in any way, even though some of these materials may be toxic as chemicals. However, fueled by a few crusading individuals and organizations, the curtailment of these necessary tools to the production of agricultural products is under way.

This situation creates for our industry and for every individual concerned a public relations and legislative problem which must be met if we are, with enthusiasm, to continue research, development, and use of chemicals for the protection of crops and health.

The principal manifestation of this problem is indicated by the increasing amount of adverse and unsubstantiated statements in the press. Here we have a problem where the statements of the psuedo-scientists, being spectacular, are avidly received; while the work of the competent scientists seldom makes the headlines.

A second manifestation is the serious legal problem resulting in unjustified and excessive liability claims.

A third important manifestation is the amount of legislation which is directed against various phases of production, marketing, distribution and use of agricultural chemicals.

In addition to the numerous laws now in existence on the statute books, during 1953 more than 250 bills with potential impact upon the production, distribution and use of agricultural chemicals were introduced. Let us look into some of the reasons for the introduction of these bills.

We find that there are approximately twenty-five bases for proposed legislation. Some are sound, others a threat to progress. Among these are:

(1) Unjustified fears on the part of the public which are reflected in so-called safety legislation. This can be broken down into the health of operators applying the materials, health of consumers using the finished food product, and the health of the general public not in direct contact with pesticides.

(2) The opportunity for legislators to win public support for political purposes, based on (1).

(3) The eagerness of "do-gooders" to protect the general public from imaginary hazards.

(4) A desire to increase revenues. This is reflected in proposals for increased fees, licenses to sell, licenses to use.

(5) In some cases a desire on the part of agencies of Government to increase controls and build up Government organizations.

(6) The efforts of other industrial groups to avoid responsibility for conducting their own research and testing.

By

Lea S. Hitchner*
NATIONAL AGRICULTURAL
CHEMICALS ASSOCIATION

(7) An effort on the part of some local groups to exclude out-of-state competition from local markets.

(8) "Bell ringer" bills. Bills introduced for nuisance value with the expectation for pay-off to withdraw or kill objectionable legislation.

(9) A sincere belief on the part of a state official or legislator that additional legislation is necessary to protect the public from either economic fraud or the possibility of harm in connection with the sale and use of pesticides.

(10) New type of product creates new problems which are not satisfactorily handled by existing legislation.

(11) Replacement of an outdated law by a modern one adapted to present day facts and needs.

(Let me interpolate here and get into the record the fact that the NACA always has and now continues to support vigorously any sound legislation which is needed to protect the public health and the best interests of the growers. All we ask is practicable and workable control and then only when needed.)

Conflicting Views on Pesticide Use

GOING back to the reasons for legislation, I mentioned only a few of the categories in which background for this legislation falls. Perhaps more important than these minor categories is the lack of an overall philosophy covering legislation and regulation.

Much has been written on the subject of agricultural legislation. There is, however, a confusion on basic philosophy covering legislation and regulation. Some of the confusion can be visualized from the following.

For instance, we have a philosophy voiced by the former Commissioner of the Food and Drug Administration, Dr. Paul Dunbar, which we have never seen reversed. He stated:

> "I feel that no chemical or no new chemical that is subject to any question as to safety should be employed until its possible, injurious effects, both on acute and over a long-time chronic basis, have been shown to be non-existent. In other words, any chemical that is proposed for use ought to be approved in advance of distribution in the food product to be utterly and completely without the possibility of human injury."

In practice, I feel confident this is not carried to the full extreme expressed by Dr. Dunbar, but most certainly the agricultural chemical industry cannot progress under such a program, and a frank recognition of the problem is justified.

The philosophy of the U. S. Public Health Service was expressed by Dr. J. G. Townsend, Chief of the Division of Industrial Hygiene, as follows:

> "On the farm, as well as in the factory, dangerous chemicals may be used safely with proper precautions. If manufacturers, processors, and distributors had to relinquish certain substances because they are toxic, American industry would be in a primitive stage. Likewise, the farmer need not how to economic pests but can use to the fullest advantage the potent new insecticides if he is scrupulous in protecting himself."

Under the policy indicated by Dr. Townsend it is both possible and practical through cooperative efforts to meet the problems and assure the public adequate protection.

The policy of the U. S. Department of Agriculture was expressed by Dr. E. L. Griffin, Assistant Chief of the Insecticide Division, Livestock Branch, Production and Marketing Administration, as follows:

> "The Federal Insecticide, Fungicide and Rodenticide Act is intended to protect users of economic poisons—that is, insecticides, fungicides, rodenticides, weed killers, and disinfectants —from faulty products and to avoid injury to persons and to beneficial plants or animals."

The administration of this law has been in the interest of the public, and generally satisfactory to industry. However, we should recognize that even where we have sound legislation, undue pressure from uninformed groups can easily jeopardize proper administration of the law.

A similar problem in our industry is represented by a few unreliable distributors of pesticides who rely solely on the old proverb "Let the buyer beware."

Between the extreme view expressed by Dr. Dunbar that the ma-

(*Turn to Page* 115)

*Before The Entomological Society of America Los Angeles, December 7, 1953

First National Weed Control Conference

Held at Kansas City

R. H. Beatty elected National President. New Herbicides, Physical Effects On Emergence, Application Studies, Control Recommendations Highlight Kansas Meeting.

IN its first convention, the National Weed Control Conference attracted some 700 persons at Kansas City, December 7-10. Held in connection with the tenth annual meeting of the North Central Weed Control Conference, the group elected as national officers, the following: Robert H. Beatty, American Chemical Paint Co., Ambler, Pa., president; W. B. Ennis, Mississippi, vice-president; and Dr. Warren C. Shaw, Division of Weed Investigation, U.S.D.A., Beltsville, Md., secretary-treasurer.

The new president is also president of the Northeastern Weed Control Conference. He succeeds Charles J. Gilbert, State Weed Board, Brookings, S. D. as national head.

The next national meeting will be held in the Northeastern area, probably New York City, early in 1956, it was announced. The present policy is to hold national meetings every two years, while the regional conferences will be convened each year as has been the custom for a number of years past.

Mr. Beatty was in charge of the opening session of the National group's convention which featured a brief talk by Hon. Wm. E. Kemp, mayor of Kansas City and prepared papers by E. P. Sylwester, Iowa State College, Ames, chairman of the Association of Regional Weed Control Conferences; Dr. Byron T. Shaw, Administrator of the Agricultural Research Service, Washington, D. C., who spoke on "Weeds—A National Problem"; P. V. Kepner, assistant director, Agricultural Extension Service, U. S.D.A., Washington, D. C., who spoke on "Extension Educational Techniques"; and W. S. Ball, California State Department of Agriculture, Sacramento, Calif., who discussed "Regulatory Aspects of Weed Control."

Subsequent sessions covered physiological aspects of herbicides and their action on plants; regulatory work; water weed control; control of woody plants, of weeds in horticultural crops; extension education; and a session on spray application of herbicides.

Chairmen of the various ses-

sions, in addition to Mr. Beatty, included Mr. Ennis; V. W. Woestemeyer, Kansas State Board of Agriculture, Topeka; F. L. Timmons, Division of Weed Investigations, U. S. Department of Agriculture, Logan, Utah; C. E. Fisher, superintendent, Texas Agricultural Experiment Station, Spur, Texas; R. D. Sweet, Cornell University, Ithaca, New York; C. I. Seely, University of Idaho, Moscow; William A. Harvey, California Agricultural Extension Service, University of California, Davis; K. P. Buchholtz, University of Wisconsin, Madison; and J. H. Burke, Aerial Applicators' Association, Oklahoma City, Okla.; and C. J. Gilbert, Brookings, South Dakota.

Sessions of the 10th annual North Central Weed Control Conference were held on December 10th. N.C.W.C.C. president, C. J. Gilbert was chairman of the opening session which included reports about weed control in various crops. W. M. Phillips, Division of Weed Investigation, U.S.D.A., Hayes, Kansas, reported on weed control in fall-sown grain; F. W. Slife, University of Illinois, Urbana, on controlling weeds in soybeans; and W. C. Elder, Oklahoma A & M. College, Stillwater, Okla., on weed control in sorghum.

Technical papers were next on the agenda in a later morning session under the chairmanship of O. C. Lee, Purdue University, Lafayette, Ind. D. W. Staniforth, Iowa State College, Ames, presented a paper, "Effect of Various Levels of Weed Infestations and Economic Consideration of Weed Control"; E. K. Alban, Ohio State University, Columbus, "Temperature and Humidity Effects on Pre- and Post-emergence Application of 2,4-D and Dinitros"; and K. P. Buchholtz, "Varietal Responses to Herbicides."

A panel discussion on field observations of weed control in corn was held with participants presenting reports from various corn-growing states of the midwestern area. These speakers were F. W. Slife, Illinois; J. R. Fleetwood, Missouri; C. J. Willard, Ohio; E. P. Sylwester, Iowa; and O. C. Lee, Indiana.

A special luncheon of the North Central Group was held at noon, with J. R. Fleetwood, University of Missouri, Columbia, presiding. Speaker for the occasion was L. M. Stahler, Pacific Coast Borax Co., Los Angeles, Calif.

The final session was in charge of H. E. Wood, Manitoba Department of Agriculture, Winnipeg, Man. It included a talk on "Control of Weeds in Pastures" by D. L. Klingman, Division of Weed Investigations, U.S.D.A., Columbia, Mo. and a panel discussion on new chemicals for weed control.

Chairman of the panel was C. E. Minarik, Chemical Corps., Biological Laboratories, Camp Detrick, Md. Participating in the discussions were the following: D. D. Hemphill, University of Missouri, Columbia, "Phenyl Dimethyl Urea"; K. C. Barrons, Dow Chemical Co., Midland, Mich., "Dalapon"; G. F. Warren, Purdue University, Lafayette, Ind., "N-1 Naphthylphalamic Acid"; Lyle Derschied, South Dakota State College, Brookings, "4-Chlorophenoxyacetic Acid and 3,4-dichlorophenoxyacetic Acid"; J. P. Mahlstede and E. L. Denisen, Iowa State College, Ames, "Analogs of 2,4-dichlorophenoxyethyl sulfate"; Richard Behrens, U.S.D.A., College Station, Texas, "Amino Triazole"; and V. J. Fisher, E. I. duPont de Nemours & Co., Inc., Manhattan, Kansas, "CMU."

A question-and-answer period was next on the program, with R. B. Widdifield, North Dakota Agricultural College, Fargo, in charge.

Recommendations for control of cotton insect pests for 1954 was the final event. These were presented by Lyle Derschied, chairman of the research committee.

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H_2SO_4 Plant Enlarged

General Chemical Division, Allied Chemical & Dye Corp., is enlarging the sulfuric acid production capacity of its Detroit Works in River Rouge, Michigan.

The company reported that while a major addition to the acid facilities of the works was put into production only recently, this new large-scale expansion is necessary immediately if the sulfuric supply in the area is to be kept in balance with anticipated demands of the next few years. The company stated that sulfuric acid needs of the steel, automotive, chemical and fertilizer manufacturers in Detroit and other nearby industrial areas have been rising rapidly and consumption in the future is expected to continue at much higher levels than the present.

The new sulfuric unit is scheduled to go into production late next summer, 1954, and will nearly double the present sulfuric capacity of the plant, making it the second largest acid-producing location among General's 20 sulfuric plants in the U. S. and Canada. Construction costs have not been announced.

General Chemical has been increasing steadily the acid capacity at its plants throughout the country in order to supply current and anticipated needs in many industrial centers. Earlier last year it announced that two other large new acid plants were being built at Painesville, Ohio and Baton Rouge, Louisiana to supply growing demands in those treas. The company has a number of other major producing works providing the Great Lakes region with sulfuric acid and other chemicals. These are located at Cleveland, Ohio; Chicago, Ill; Buffalo, N. Y.; Newell, Pa. near Pittsburgh; and Nitro, West Va.

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FAO Names Cardon as Head

Philip V. Cardon has been named by the Food and Agriculture Organization of the United Nations as director general for a two-year term. Associated for many years with the United States Department of Agriculture, Mr. Cardon has been associated with the FAO since its beginning in 1943.

As director general, he will succeed Norris E. Dodd, formerly Under-Secretary of Agriculture in the Truman administration. Mr. Dodd has taken over the FAO job in 1948, succeeding Lord Boyd-Orr of Great Britain.

Entomologists Meet

H. H. Ross, University of Illinois, new president of society. George Decker president-elect for 1955

THE American farmer, faced with the problem of providing food for five persons in the United States in 1975 instead of the four served in 1950, must look to the entomologist and the chemist for help in boosting his production, the first annual meeting of the Entomological Society of America was told in Los Angeles by Dr. Charles E. Palm of Cornell University, its retiring president.

Six hundred seventy attended the four-day convention at the Biltmore Hotel in Los Angeles, Dec. 7-10. More than 200 papers were given, plus symposiums, and there were several exhibits by chemical and other firms.

Dr. H. H. Ross, Professor of Entomology, University of Illinois, Urbana, Illinois, is the new president of the society, with Dr. George C. Decker, Illinois Natural History Survey, Urbana, president-elect for 1955.

Members of the board of directors for 1954 include: Section A (General Entomology) E. G. Linsley, Berkeley, Calif.; Section B (Physiology and Toxicology) H. H. Shepard, Washington, D. C.; Section C, (Insect Biology) R. H. Painter, Manhattan, Kan.; Section D, (Medical and Veterinary Entomology) Carroll N. Smith, Washington, D. C.; Section E. (Control, Survey and Regulatory Entomology) H. M. Harris, Ames, Ia.; Section F. (Chemical Control Investigations) P. J. Chapman, Geneva, N. Y.; Cotton States Branch, M. D. Farrar, Clemson, S. C.; Eastern Branch, B. A. Porter, Washington, D. C.; North Central Branch, J. W. Apple, Madison, Wisc.; Pacific Slope Branch, S. F. Bailey, Davis, Calif.; Southwestern Branch, J. C. Gaines, College Station, Texas.

Dr. Ashley B. Gurney was selected by the board as permanent secretary for the society. He was formerly with the U. S. National Museum, Washington, D. C.

"Much has been said," Dr. Palm commented in his address opening the convention, "about the continuing conflict between man and insects, yet the importance of the conflict increases daily as the upswing in human populations in all areas of the world demands food and fibers as well as protection from insect-borne diseases. Insect vectors of disease pathogens which cause losses of health, productivity, and life itself in plants, animals and man are a constant menace to human welfare."

"In the field of human health alone, it has been estimated that 5,000,000 lives have been saved and 100,000,000 illnesses prevented since 1942 by the use of DDT for the control of insects associated with malaria, typhus, dysentery, and other insect-borne diseases. The incidence of malaria in the United States is at an all time low because of effective work by entomologists and public health officials."

Dr. Palm quoted USDA estimates that the nation suffers losses from insects amounting to $4,000,000,000 annually and $3,000,000,000 from plant diseases and then asked: "What would the loss figures be were not the best efforts of those two professions engaged in all-out programs of pest control?"

"American farmers are spending about $300,000,000 annually for pest control, and the agricultural chemical industries are spending an estimated $8,000,000 each year on pesticide research to provide new and more effective chemicals for agriculture and public health." He lauded the support given college and experiment station research by members of the National Agricultural Chemicals Association and the service given by the agricultural press in distributing up-to-date information to farmers and others concerned with insect control.

"The key to future gains and our ability to serve," he concluded, "lies in the support and conduct of

E.S.A. Officers

(L. to R.) Dr. Charles E. Palm, Cornell Univ. retiring president. Dr. Herbert H. Ross, Univ. of Illinois, president-elect 1954. Dr. George C. Decker, Illinois Natural History Survey, president elect 1955. Photos on this and succeeding pages by Charles Starker, Pacific Supply Cooperative, Portland.

in Los Angeles

Man overhauling insects, says Hoyt. Increased demand seen for insecticides toxic to wide range of insect species.

basic research in broadest terms for all aspects of entomology."

Insects vs. Man

DR. George C. Decker, Illinois Natural History Survey, Urbana, delivered a major address on "The Role of Insects in the Economic Future of Man." After pointing out that man exists only through his ability to outsmart insects, and has been fighting an uphill battle in his attempts to displace a well-adjusted and highly versatile population which bars no holds to recover its lost property, he pointed out that insects each year in the United States alone "destroy crops, livestock and farm produce equivalent to the entire agricultural output of the five New England States, plus New York, New Jersey and Pennsylvania. Stated in another way, insects nullify the labor of at least 1,000,000 working men each year."

The plant pest problem has been with man from the dawn of history, and in this country by 1850 crop losses to insects had become so serious farmers began agitating for scientific help. This resulted in the appointment of Townsend Glover as entomologist in the U. S. Patent Office in 1854, eight years before the USDA was created.

Local Arrangements Committee

(L. to R.) 1st Row: R. L. Metcalf, Univ. Calif., Citrus Exp. Sta., Riverside; R. E. Campbell, USDA, Whittier; Ed Littooy, Colloidal Products, San Francisco. 2nd Row: A. F. Swain, Eston Chem. Div., American Potash & Chemical Corp., Los Angeles; Otto Steinen, Naugatuck Chem. Div., U. S. Rubber Co., Riverside; C. H. York, Shell Chem. Corp., Ag. Chem. Div., Los Angeles; George Poppic, Coastal Chem. Co., Oxnard, Calif.

"Perhaps it is a tribute to the entomological profession," Dr. Decker said, "that in one century the major insect pests (bad as the situation may seem today) have been brought under control to the extent that there is danger this historic concept of the proper relationship between entomology and other phases of agricultural research may be reversed. Now we find men in high places so blinded by their own successes in the applied arts that they regard the fundamental sciences of mathematics, chemistry and biology as mere tools which should be placed in their incompetent hands for guidance, supervision, and use. In some organizations this rape of a fundamental science (Plant Pathology) has already transpired with disastrous results . . . The future of insects is closely tied up with the future of entomology, and if the fundamental sciences, including entomology, are to be subjugated by the applied arts, then Heaven help Entomology! The insects will be fully capable of looking out for themselves."

The speaker observed that "it seems apparent that farmers were share-cropping with or for the insects, and that the insects' share may have been in the neighborhood of 50%."

Insect losses have often been grossly underestimated, the speaker said. "Not only do we fail to recognize and evaluate hidden or obscure losses," he said, but all too often conspicuous crop losses are misidentified and attributed to drouth, excess rain, poor seed, or just plain hard luck. Sod webworm larvae, well hidden in the turf mat and unobserved, frequently cut and consume practically all of the green foliage in parts of a lawn or pasture, thereby exposing dead brown leaves of the turf mat, and the owners scream "Drouth!", even though there may be adequate moisture in the soil."

After reviewing the advances in insect control with DDT, the speaker observed that "it seems highly probable we are still far from attaining either perfection or the universal use of adequate insect control measures. Therefore, further

improvements in insect control might well produce gains equal to or greater than those already attained. . . .

"There is an abundance of scattered data to indicate that the control of specific pests on many crops might double, treble, or even quadruple production. There are data on alfalfa, cotton, tobacco, many fruit and vegetable crops as well as standard cereal and forage crops that indicate increased yields of 25, 50, or even 100% frequently accompany effective insect control."

There are those, he said, "who will insist we cannot afford the added cost of insect control or that we dare not add to our overhead costs. Such assertions are economically unsound. If one can increase yields . . . those extra pounds, bushels or tons are produced much more cheaply than the rest of the crop and have the effect of reducing operating costs."

Sees No "Universal Insecticide"

INCREASED demand for insecticides which are toxic to a wide range of different species may be anticipated, said Roy Hansberry of Shell Development Company's agricultural research division of Modesto, Calif. While admitting that most toxicologists are forecasting an ever-increasing number of insecticides with specificity of action, he said that "some of the newer and better phosphate materials, however, have shown ability to control a wide spectrum of insect pests." He said he believes that a universal insecticide is neither possible nor desirable, and that "it seems logical to assume that we may actually increase the number of insecticides in commercial usage, and at the same time increase the range of application of each individual material."

Cost of developing a new insecticide is staggering, the speaker said. "The years of research and testing, the cost of toxicological evaluations, residue determinations, production and sales development, quickly mount . . . If the costs of fruitless research, administrative overhead and amortizations of capital in plant construction are added to these more direct costs, the figure goes far higher.

"Industry is naturally anxious to reduce these costs . . . During the first two or three years that a chemical is marketed, it must be sold at a high price. During this period, when the selling price is the highest, the manufacturer almost always loses money. A chemical that may eventually be manufactured at a level of 10,000,000 pounds a year and profitably formulated, packaged, distributed and sold for $1 a pound, is likely to cost $5 a pound for the first 10,000 pounds produced. The great effectiveness of the chemical may enable the manufacturer to sell his first 10,000 pounds for as much as $2.50 a pound. This, of course, results in the regrettable situation of the manufacturer's having to lose $2.50 a pound on a chemical for which a farmer is paying 2½ times the cost for which the chemical may eventually be sold. A still further irony is that by the time a material reaches the comfortable stage where its use is profitable to both the maker and farmer, a better chemical comes along."

Man Overhauling Insects, Says Hoyt

THE future looks bright in man's continual warfare against insects, Dr. Avery S. Hoyt, chief of the Bureau of Entomology and Plant Quarantine stated. "Although in-

Top Photo: J. M. Magner, Monsanto; Stephen E. Easter, Velsicol Corp.; and Glenn E. Carman, Univ. Calif. Citrus Exp. Sta. 2nd row: Don C. Mote, consulting entomologist, Corvallis; and Charles O. Persing, Stauffer Chem. Co. 3rd Row: R. B. March, Univ. of Calif. Citrus Exp. Sta.; Earl Pritchard, Univ. of Calif.; and David Hall, USDA, Washington. 4th Row: Lea S. Hitchner, executive sec. N.A.C.A., Washington; and L. J. Padgett, USDA Insect Pest Survey, Oakland. 5th Row: S. B. Freeborn, Univ. Calif.; and R. D. Eichman, Stauffer Chem. Co. Bottom Row: C. C. Alexander, Geigy Co.; E. J. Newcomer, USDA, Yakima; and J. L. Horsfall, Geigy Co.

Top (Pg. 55): Discussing Hercules 4-H Entomology exhibit, (l. to r.) Stanley W. Strew, Chipman Chem. Co.; Richard J. Both, Hercules Pow-

sects have been here far longer than man, man is rapidly overhauling them in the race for food, clothing and shelter."

Dr. Hoyt warned that "there is need for care in approaching the future offensive against insects. Obviously the approach must be selective. The indiscriminate destruction of insects, leading to the extermination of species, might well be a tragedy second only to a complete lack of control. Efforts to suppress the noxious forms must not lead to overlooking the necessity for utilizing those of benefit," he pointed out.

The American public is becoming fearful of unjustified hazards, due to the efforts of would-be scientists unacquainted with the tremendous amount of scientific research to the contrary, and to the legal protection now in existence, stated Lea S. Hitchner, executive secretary of the National Agricultural Chemicals Association.

The Miller Pesticide Residue bill now before congress was praised by Mr. Hitchner as being a basically sound and practical piece of legislation under which all can operate, with the public fully protected from any hazards." See pages 48-49 for full text of Mr. Hitchner's address.

Entomology in Foreign Lands

ENTOMOLOGISTS going to other countries to work often encounter complications due to language, lack of understanding of their customs, background and economy, stated Steven E. Easter, Foreign Division, Velsicol Corporation, Chicago. "If not properly understood, these difficulties can slow down or render ineffective control programs in those areas," His advice to those who plan to work in foreign areas is to remember that when going to country "X", you are the "foreigner." Keep an open mind about the solution of their problems until you get there, don't pre-form control programs; think of solutions in terms of the economy of the area.

"Language is still the biggest single problem in foreign work, but in many areas insecticides, when available, are very expensive and quite often when a certain material is needed, it cannot be obtained," Easter stated.

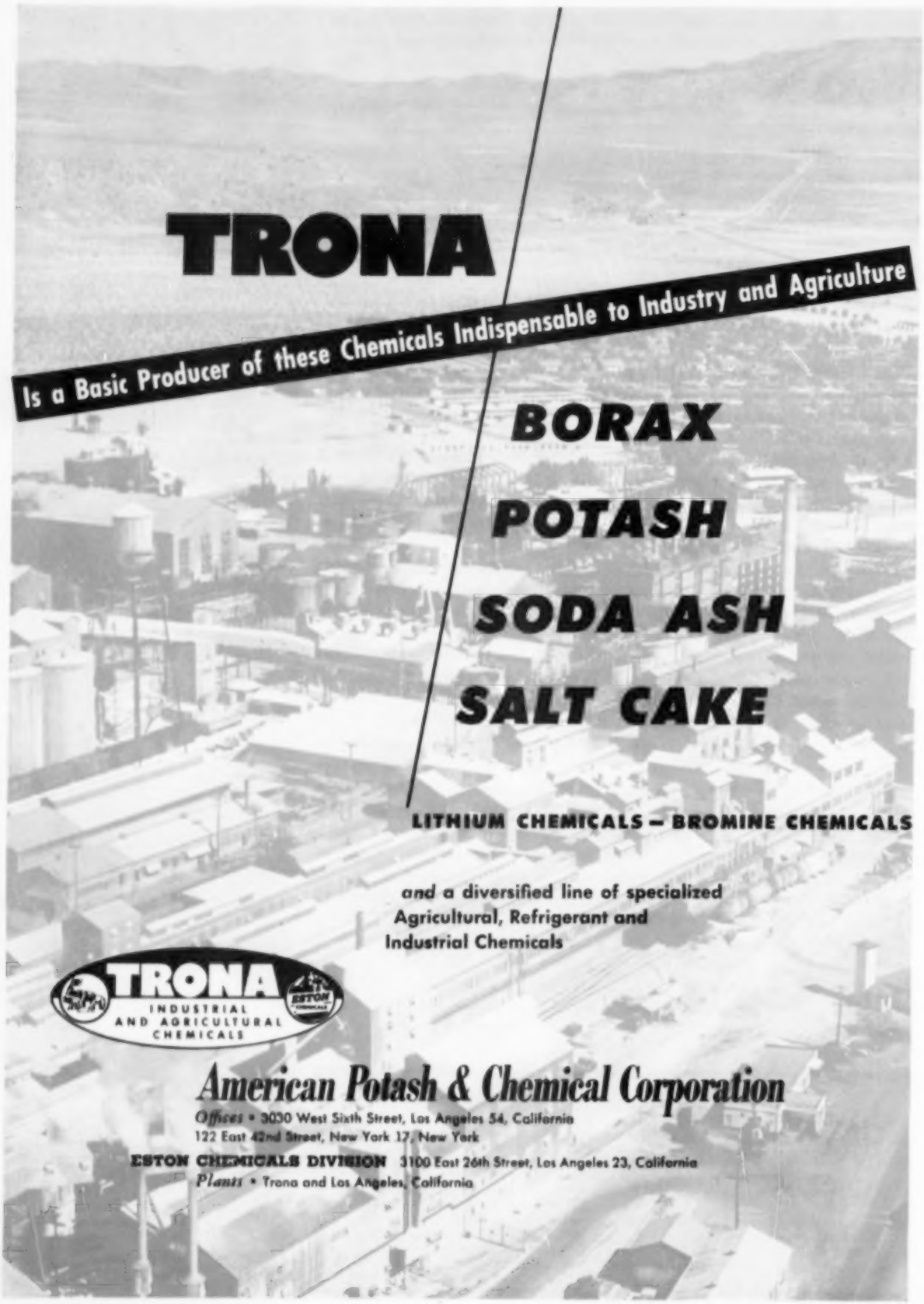
"Cost of labor is one of the chief differences between entomology work in this country and that in less developed areas. As most of our control programs here are designed to save labor, another line of reasoning is needed for areas where machinery, when available, is high priced, but labor exceedingly cheap. We would not think of hiring workers to hand-pick egg masses from an agricultural crop, but this technique is followed in some sections. Insecticide formulations designed for use in foreign areas need to be simple and designed for the use and needs of that country."

"Because of a serious lack of trained field personnel, serious or potential insect infestations are not being located in many countries" he said. "The work which is now being done is mainly on the 'spectacular' pests, but there are many others of much greater importance.

Easter cited the excellent work of aldrin in controlling desert locusts in Iran; the use of BHC in Italy on Moroccan locusts, where formerly the sodium arsenate used killed off sheep in large numbers."

(*Turn to Page* 122)

der Co.; M. P. Jones, USDA Ext. Service; and H. F. Pierce, Hercules. 2nd Row: Clyde W. Kearns, Univ. of Illinois; Alfred M. Boyce, Calif. Citrus Exp. Sta.; F. S. Roberts, United Fruit Co.; and Sam McCampbell, Selco Supply Co., Ft. Collins, Colo. 3rd Row: John Nickelsen, Supervised Control Service, Shafter, Calif.; N. W. Hazel, Control Service, Arvin; E. N. Woodbury; and H. Pierce, Hercules. 4th Row: O. B. Hitchcock, U. S. Ind. Chem. Co.; D. H. Brannon, State College, Wash.; Paul M. Eide, NW Wash. Exp. Sta.; and L. L. Stitt, Velsicol Corp. 5th Row: R. C. Bushland, BEPQ, Kerrville, Robt. J. Geary, Farbenfabriken Bayer, and George Veith, Veith Chem. Co., Fresno. Bottom Row: W. W. Allen, Univ. Calif.; C. A. Ferris, Geigy; Ray F. Smith, Univ. Calif.; and C. L. Turzan, Geigy.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'53 Cotton Conference Held

Reports on Systemics, Pink Boll Worm, Insecticide Resistance, '53 Research Highlights and '54 Control Recommendations Featured at Confernce.

A PANEL discussion of systemic insecticides, reports on insect resistance, the pink bollworm problem, other cotton insect control problems and announcement of the 1954 cotton insect control recommendations were featured at the seventh annual Cotton Insect Control Conference held December 16 and 17 at the Peabody Hotel, Memphis. More than 700 representatives of industry, research workers, and Dept. of Agriculture personnel attended the session, which is sponsored by the National Cotton Council. C. R. Sayre, Delta & Pine Land Co., Scott, Miss., and H. J. Johnston, National Cotton Council, Memphis, presided at the various sessions.

In a report on "Insect Resistance to Insecticides," S. F. Knipling, USDA, Washington, D. C., indicated that with the more widespread use of insecticides, there is "every reason to believe that many of our major pests will become resistant to them." He reported that the marked increase in resistance of the cotton leafworm to toxaphene this year has been of special concern; that it has been noted too, that the cotton aphid and codling moth are not always controlled satisfactorily by the accepted benzene hexachloride applications which might indicate the development of resistance to this insecticide; still another new problem is what appears to be developing resistance to DDT by lygus bugs on alfalfa. Dr. Knipling emphasized that the only solution to the problem is continued and expanded research on chemical and biological means of control.

W. W. Allen, Dow Chemical, Midland, Mich., and vice-president of the National Agricultural Chemicals Association, addressed the conference in connection with the "Insecticide Industry's Program in 1954," and indicated that although there is no shortage of pest control chemicals on the market today, there still remains a problem of efficient distribution. In connection with the issue of toxicology, Mr. Allen indicated that, while no legislation is ever perfect, the Miller Pesticides Residue Amendment to the Federal Food and Drug Act is the best piece of legislation yet submitted on a federal level to safeguard public health. Among other phases considered in Mr. Allen's address were the future of systemics, toxicology studies and research, and a review of insecticide supply and demand.

Systemics Promising for Cotton

THE increased interest in systemic insecticides and their use in the cotton industry, their limitations and future were discussed by a panel, headed by K. P. Ewing, Agricultural Research Service, USDA, Washington, D. C. E. E. Ivy, USDA, BEPQ, College Station, Texas, pointed out that certain systemic poisons already have been proved practical for use by cotton growers . . . however, they were developed largely through a trial-and-error process. He said that researchers found that some chemicals would find their way into a plant's system and poison an insect's food supply. They didn't find out exactly why this action took place, and thus were hampered in trying to come up with systemics that would be effective against a wide variety of pests.

According to H. T. Reynolds, University of California, Riverside, systemics can be applied as sprays, in irrigation water or painted on the trunks of trees. Tests with radioactive tracers have shown that the chemicals are absorbed by the sap system and carried to all parts of the plant. He continued to say that there are indications that seeds soaked in systemic insecticides will produce plants toxic to certain feeding insects; furthermore, new growth appearing after the insecticide has been applied to plants also becomes toxic.

Dr. Reynolds reported that tests with systemics in southern California indicate that the use of "Systox" is compatible with pollinating insects. Tests made in cotton and seed-alfalfa fields resulted in no appreciable bee losses, even when Systox was sprayed at one-half pound per acre directly over the bee colonies. Both OMPA and Systox have been accepted for use on cotton in California. He indicated that the limiting factor in the use of systemic insecticides at present is the possibility of harmful residue . . . however,

Members of symposium discussing Systemic Insecticides: W. Scott James, Pittsburgh Coke and Chemical Co., Pittsburgh; E. E. Ivy, Agricultural Research Service, College Station, Tex.; K. P. Ewing, USDA, Washington, D. C.; H. R. Carns, USDA, Delta Branch Experiment Station, Stoneville, Miss.; H. T. Reynolds, Citrus Experiment Station, Riverside, Calif.

"the future of cotton with systemics should prove interesting, particularly as control of pests such as boll weevil and pink bollworm is concerned." Moderate toxicity has been found in tests with certain species of scales, thrips, leafminers, and leafhoppers, and good results so far have been reported with most species of mites, aphids and mealybugs.

Systemic insecticides represent the "fourth stride" in the development of chemical insect control, according to W. Scott James, Pittsburgh Coke and Chemical Co., Pittsburgh. He indicated that the arsenical and botanical insecticides could be considered the initial stage of the development, followed by DDT and the chlorinated hydrocarbon group, and third the organic phosphate era including TEPP, HETP, and parathion. Mr. Scott indicated that he felt systemic development would move rapidly toward a solution of problems involving toxic residues left in cotton fiber and cottonseed products.

In discussing "Plant Physiological Aspects of Systemics," H. R. Carns, USDA, Stoneville, Miss., pointed out that the chemical must penetrate the wax surface of the plant, ie the cuticle. He said that non-ionized molecules make this penetration more rapidly than ionized molecules, but that the addition of surface active agents to a chemical product would increase or regulate the absorption rate.

Pink Bollworm Threat

"RECENT expanded efforts are still inadequate to control the pink bollworm when its total destructive potentiality is considered," according to Dr. F. C. Bishopp, Cooperative Pink Bollworm Research Project, Brownsville, Texas. He pointed out that in 1952 this pest inflicted damage on the cotton crop in 39 south Texas counties amounting to approximately 29 million dollars.

Preliminary results of herbicide and insecticide experiments indicate that "Dilan" is about as effective against the pink bollworm as DDT; however, Dr. Bishopp cautions that one year's findings are not enough, "upon which to base sound conclusions."

According to R. W. White, BEPQ, San Antonia, Texas, cotton crops in Arkansas, Louisiana and Mississippi will be seriously threatened by the pink bollworm if heavy infestations continue to build up in east-central Texas. He urges production of an early cotton crop followed by prompt harvesting and thorough destruction of crop residues as key steps in controlling the pest.

C. B. Ray, Rio Grande Valley Farm Bureau, Mercedes, Texas, stressed the importance of developing community consciousness of the pink bollworm and how it may be controlled. Particular emphasis was placed on the need to educate the community to act simultaneously in destroying cotton stalks, planting, etc., as means of controlling this pest.

A review of the Texas Experiment Station program for pink bollworm research was presented by R. D. Lewis, director of the station. An outline of chemical, mechanical and physical control measures, their program of study, an evaluation of economic control measures, as well as the effect of combining all procedures thought to be effective in control of the pink bollworm were among the phases discussed.

1953 Research Highlights

RESEARCH highlights of 1953 were reviewed in reports from the southeast, mid-south, southwest, and far west. Dr. J. C. Gaines of Texas A. & M. College, College Station, told the conference that chemicals alone will not yet give adequate control of the pink bollworm. Cotton growers must still depend to a large extent on cultural control practices. Early planting, for example, makes it possible to destroy the cotton stalks early, thus reducing the number of overwintering worms. He reported that in central Texas, toxaphene-DDT spray, toxaphene dust, 3-5-40 dust and DDT dusts and sprays were used generally in an effort to control the cotton bollworm. He indicated that whenever these materials were properly applied, excellent control was obtained.

Presenting the picture for the southeast, F. S. Arant, Alabama Polytechnic Institute, Auburn, reported that endrin at .2 to 1 lbs. per acre gave good to excellent control of the boll weevil, boll worm and spider mite; chlorthion, at .35 to .75 lbs. per acre gave good control of boll weevils, no control of boll worm, and was effective at .25 lbs. per acre against mites; methyl parathion at .35 to .5 lbs. per acre was effective against the bollworm; and aramite at .5 to 10 lbs. per acre gave good control of the

spider mite. Gamma BHC at .5 lbs. per acre controlled the cotton aphid.

C. G. Lincoln, University of Arkansas, Fayetteville, Ark., summarized studies and results in the southwest, indicating that endrin applied at .4 lbs. per acre at seven day intervals gave good control of the boll weevil; and Systox was effective in control of mites and aphids. He reported further that the chlorinated hydrocarbon insecticides did not offer a hazard to crop growth due to soil residues, when used at recommended dosages. Anticipating a possible problem in drift of cotton insecticides to adjacent rice crops, tests indicated that most cotton insecticides are not harmful to rice in bloom. Calcium arsenate, however, is toxic to the rice plant.

"Because we do not have some of the more serious cotton pests, our insect control is different in some respects from that in other areas" explained G. L. Smith, California Agricultural Experiment Station, Shafter, Calif., as representative of the far west. He reported that cotton growers in irrigated areas of the west are urged to: (1) use chemicals only when an insect has reached the level at which research has shown it is economical to attempt control; (2) be certain that the chemical applied is as specific as possible for the pest and least injurious to beneficial insects; and (3) be certain that the amount of toxicant applied is sufficient to give a high degree of control so that frequent applications can be avoided whenever possible. One highlight of thrips control, he indicated, is the rapid build-up of mites in treated plots in contrast to untreated cotton on ranches in the San Joaquin Valley.

According to C. A. Vines, Ark. Agric. Extension Serv., Little Rock, sound insect control is essential to preserve early maturing qualities developed by cotton breeders. It also will result in more uniform maturity of the plant, making proper defoliation possible, and will permit earlier fruiting to mature an earlier crop. He emphasized that insect control is not a separate operation, but an integral part of the entire process of cotton production, in his presentation of "Insect Control . . . An Essential Factor in Modern Cotton Production." In presenting "An Expanded Research and Education Program for Cotton Belt Agriculture," Clay Lyle, Miss. State College, State College, Miss., emphasized the need for farmers to adopt the new practices of farming, and the importance of educating the farmer to these practices.

M. D. Farrar, Clemson Agricultural College, Clemson, S. C., told the conference that "The only answer to the problem of cotton income is increased production per acre," in his paper "Gearing Cotton Insect Control to a Balanced Farm Program." He listed seven fundamental scientific steps for cotton producers to follow to increase production. They are: (1) Grow only a well bred, wilt-resistant variety; (2) select and prepare fertile, well-drained and warm natured soil; (3) fertilize properly with the recommended grade and amount of fertilizer; (4) plant and maintain a full stand; (5) cultivate to keep the crop clean; (6) harvest and gin to produce high grade lint cotton; (7) follow recommended practices of insect and disease control. The importance of mechanical stalk destruction soon after harvest to reduce the populations of some of the more destructive insects was emphasized.

1953 Cotton Insect Control

INSECT control in the high elevations of Arizona was discussed by J. N. Roney, Arizona Agricultural Extension Serv., Phoenix. He reported that toxaphene, DDT and dieldrin proved effective in control of cotton thrips in areas above 2200 feet; at lower levels, thrip infestation ranged from nothing to severe. He reported that a systemic insecticide effectively controlled injurious numbers of cotton aphids in Arizona during the past season. Systox gave complete control of aphids late in the summer of 1953.

G. D. Jones, North Carolina Extension Service, Raleigh, offered as a successful insect program one that included the following points: (1) proper fertilization; (2) use of adapted seed; (3) good weed control and cultivation; (4) timely and thorough insecticide applications as needed, and (5) marketing on grade or staple value.

Poor control of aphids and bollworms reported in several parts

(*Continued on Page 121*)

Left: H. G. Johnston, National Cotton Council, Memphis; Dr. F. C. Bishopp, Pink Bollworm Research Project, Brownsville, Tex.; and C. L. Welch, National Cotton Council.

Right: W. W. Allen, Dow Chemical Co., Midland, Mich.; M. D. Farrar, Clemson Agr. College, Clemson, S.C.; and Dr. E. F. Knipling, USDA, Washington, D. C.

Big Attendance at Chicago Meeting of National Joint Committee on

Fertilizer Application

By
H. H. Slawson

MANUFACTURERS of fertilizer application equipment are making a real effort to keep pace with demands of farmers for improved machines which will make possible better utilization of new developments in fertilizer research. This was the reassuring word brought to the Dec. 7 meeting in Chicago of the National Joint Committee on Fertilizer Application by C. A. Guelle, sales specialist with International Harvester Co. Mr. Guelle spoke as the representative of the Farm Equipment Institute.

The meeting at Edgewater Beach Hotel was held in conjunction with the winter meeting of the American Society of Agricultural Engineers. Other phases of fertilizer application were covered during the one-day conference by numerous authorities, including college scientists, various allied organization representatives and a practical farm operator.

Manufacturers, Mr. Guelle said, are being asked for equipment with longer life; and which will reduce handling costs in application; provide more accurate metering; and make placement to provide maximum return from the fertilizer.

These problems, he said, are being studied under a program sponsored by the Farm Equipment Institute. Progress is being made, but results from some projects are still inconclusive.

Corrosion of application machines, he went on, is one of the major problems faced. A study is under way of both construction materials and coatings but no complete answer can be expected in a short time. As to the basic material, grey iron has been found to be the best compromise between the corrosion problem and costs. Galvanized sheet steel has been found advantageous in hoppers because this material reduces weight some 10 percent.

One manufacturer, Mr. Guelle reported, decided that stainless steel in certain situations is the only solution to the corrosion problem. This would be costly but, in the long run might prove less expensive than use of present materials.

Various Coatings Studied

In the field of coatings, use of cadmium over copper is being investigated, but no conclusions have been reached as yet. One company has, for five years, been investigating many types of coating but so far has found none to be effective because of the abrasive action of field operation or as a result of the scraping and gouging sometimes resorted to by the farmers to clean up their machines.

"It would help a lot," Mr. Guelle interjected, "if the farmer could be educated to care for the coating on his fertilizer equipment as he does for that on his car."

He reviewed work on improving metering attachments and to attain more accurate placement and also described new machines now available which reduce fuel and labor costs by combining fertilization and seeding of worn-out pastures into one operation. New equipment is also available, he stated, with hinged or removable hopper bottoms which permits access to feed wheels for cleaning.

Bearings and gears are now protected better from the fertilizer, Mr. Guelle continued, while hoppers are being made larger to reduce labor for loading and to better accomodate the larger amounts of fertilizer now being used. As this trend to increased use of fertilizer and its extension into new areas continues, Mr. Guelle said, in conclusion, the farmers can rest assured that manufacturers are on their toes in their endeavor to provide improved details for their machines in step with the latest research findings.

Some practical observations on desired improvements in fertilizer application equipment were offered by A. G. Thompson, who has for over 30 years served as farm manager for a large commercial farming enterprise and more recently launched his own 750-acre Thompson's Farms near Bordentown, N. J.

One of the greatest needs, he said, is some way to apply more accurate tonnage per acre and also even distribution throughout the field. Linkages and connections, which are perfect when the machine is new, wear down, he noted, and the farmer has to set the distribution controls by eye, but can never set them the same way twice. Drills, he said, should be made so they can be set with a 100 lb. tolerance and certain parts should be redesigned so that if there is a little play in the linkage, it would make no difference in the settings.

More flexibility is needed in the adjustments of band placement drills, Mr. Thompson declared, and suggested that manufacturers should add plastics to their list of possible new materials under investigation to counter corrosion and abrasion problems.

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in fertilizer materials, Dr. Edwin C. Kapusta, National Fertilizer Association, Washington, D. C., reviewed the industry's accomplishments in expanding plant facilities for production of synthetic ammonia, solid urea, phosphates, potash and other ingredients. He also outlined the potential future demand and plant capacity for meeting it.

Some 45 manufacturers have installed granulating equipment, Mr. Kapusta said and by the end of the present fertilizer year possibly 10 percent of the mixed fertilizer production may be in granular form. There is need, he asserted, for action to clarify standards for granule size, now so varied because of the many procesing techniques in use.

The fertilizer industry, Mr. Kapusta concluded, is in a stage of technical transition. Much work is being done on development of plant foods with new chemical characteristics and in the near future more will be seen on the market.

Increased use will be made of airplanes for applying fertilizers, Dr. Firman E. Bear, professor of agricultural chemistry at Rutgers Univ., forecast in his discussion of "New Horizons In Fertilizer Application." The planes, he said, are destined for a greater role in treatment of range lands and pastures and for strewing fertilizer on rice fields, cranberry bogs and tomato acreage, where there are tremendous possibilities for doing a better fertilizer job than by any other means. Manufacturing techniques for pellet production will improve, he was confident, and, since complex machinery is not required, he felt that use of pelletized mixtures will bring greater savings to the farmers.

Dr. Bear also reviewed in detail present methods for deep, shallow or surface application of solid or liquid fertilizers and limestone on particular crops and various types of soils, and outlined his ideas on best ways to get maximum results. To the engineers and machinery men present he suggested that there is great need for development of means for bringing back into production land that has been ruined by bad management.

Fertilizer Placement

THE afternon session of the Chicago conference was devoted to a panel discussion of "Placing Fertilizer For Efficient Production," with Kirk Fox, editor of *Successful Farming* as moderator.

Cotton farmers have come a long way in their use of fertilizer, according to the first speaker, Leonard Lett, of the National Cotton Council. In 1922, only 30 percent of the total cotton acreage was fertilized, whereas in 1953 this had nearly doubled to 58 percent. The amount applied per acre has also steadily increased, the average per acre in 1953 being 355 pounds.

"Cotton farmers," Mr. Lett continued, "have hardly begun to approach the limits of profitable utilization of fertilizers. They are learning how to use it to cut production costs and increase yields. To keep cotton competitive they are turning to mechanized operations and are depending on fertilizer to keep the plants healthy and vigorous throughout their life cycle, so that they grow to the right height for getting maximum efficiency from the harvesting machines."

Asking "How far can we expect to go to increase corn yields with fertilizer?" G. A. Cumings of the USDA Bureau of Plant Industry, Soils and Agricultural Engineering said that by efficient use of fertilizer it is estimated that yields of 190 bushels per acre can be expected in the northern part of the corn belt and 290 bushels in the southern section. He examined in some detail the varied schools of thought on methods of application, from broadcasting to deep plowing, row application, side dressing, etc., and continued with the declaration that the many controversies on these matters make machinery manufacturers far from optimistic about prospects for pleasing everyone. A wide variety of designs to serve particular conditions in specific areas can be expected, he said.

Touching on the machinery corrosion problem, Mr. Cumings suggested that use of expandable parts might be practical in some places. The rapid expansion of use of liquid ammonia, he warned, should not obscure continued attention to solid fertilizers. He also raised a number of questions on what additional machines may be required.

Dr. H. A. Woodle of Clemson Agricultural College, Clemson, S. C., suggested that in the midst of all the conflicting ideas on fertilizer application methods, "The main thing is to get the fertilizer on."

Dr. A. L. Lang, Univ. of Illinois, another panel member, agreed with Dr. Woodle. "Where to put it" he said, is relatively unimportant while "just put it on" should be the primary guiding motive.

In Illinois, Dr. Lang said, soil scientists are not inclined to look at any one crop as being in need of fertilizer. Instead, they examine the soil to see if it needs amendments to meet the needs of a given crop.

The Univ. of Illinois is thus advocating soil tests to determine, first of all, what the particular soil needs. "In Illinois," Dr. Lang said, "we are trying to teach farmers to use as little fertilizer as possible." That philosophy, he added, has resulted in use by Illinois farmers of twenty times as much fertilizer now as they used in 1940!

Concluding the panel discussion, Robert Merrill, Deere & Co., spoke briefly on the efforts of machinery designers to follow closely the changes recommended by researchers.

Dr. S. D. Gray, American Potash Institute, who served as acting chairman of the Committee, reviewed briefly the history of this group since its inception in 1925 and listed some of its achievements in pursuit of its objectives. In stimulation of research, he declared, the Committee has been a most potent factor in developing fertilizer technology and usage. As sponsors of the Committee, he listed the American Society of Agricultural Engineers, the Agronomists and Horticultural Science Societies, National Fertilizer Association, National Canners Association and the Farm Equipment Institute.

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We believe you will find it highly interesting reading.

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Cotton Farmers Get Bigger Loans If They Use New Weed Killer

• • •

A Southern Banker Will Lend $2 More Per Acre If Soil Is Treated With Chemical

By Sydney B. Self
Staff Reporter of The Wall Street Journal

NEW YORK — A new weed killer may offer Southern cotton farmers an opportunity to increase the amount of loans they can obtain on their plantings.

At least one Southern banker has indicated he is willing to lend $2 more per acre if a farmer will use a recently developed "pre emergence" weed killer that prevents grass from choking out the young cotton plant. Ellis Woolfolk, a director of Union Planters Bank in Memphis, Tenn., and Planters Bank of Tunica, Miss., said, "I have been watching this development for several years and I am now completely sold on it and recommending it."

Weed Killers Help Cotton Farmer

The weed killer, expected to go into large scale use next spring, has the jaw breaking name of isopropyl N (3-chlorophenyl) carbamate, called Chloro IPC for short. Its chief maker is Columbia-Southern Chemical Corp., a subsidiary of Pittsburgh Plate Glass Co. It also is produced on a smaller scale by U. S. Industrial Chemicals division of National Distillers Corp. and by Monsanto Chemical Co.

The notable advantage of the Chloro IPC is that it prevents grasses from germinating. Other weed-killers, like the well-known 2,4-D, kill broad leaf plants when they are fully grown; still others kill grass when it is grown. But this chemical is applied to the soil before the grass starts to grow.

Must Be Hoed by Hand

Grass, which grows in the rows close to the young cotton plants, is one of the Southern farmer's biggest headaches. Tractors can cultivate the spaces between the rows but the in-the-row grass has to be hoed out by hand.

"I estimate that the Chloro IPC will cut the farmer's hoeing cost from a probable $17.50 per acre and a possible $30 per acre down to a $3.50 minimum and a $7.50 maximum cost per acre," Mr. Woolfolk says. Hoeing costs, of course, vary greatly according to the state and the weather.

THE "NIGHTCAP" WITH A KNOCKOUT

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they're positively deadly to bugs!

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(25% emulsifiable solution—2 lbs. methoxychlor per gal.)

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(90% methoxychlor)

GEIGY METHOXYCHLOR "20"
(20% methoxychlor solution)

GEIGY METHOXYCHLOR "50"
(50% methoxychlor wettable powder)

GEIGY 5% METHOXYCHLOR DUST

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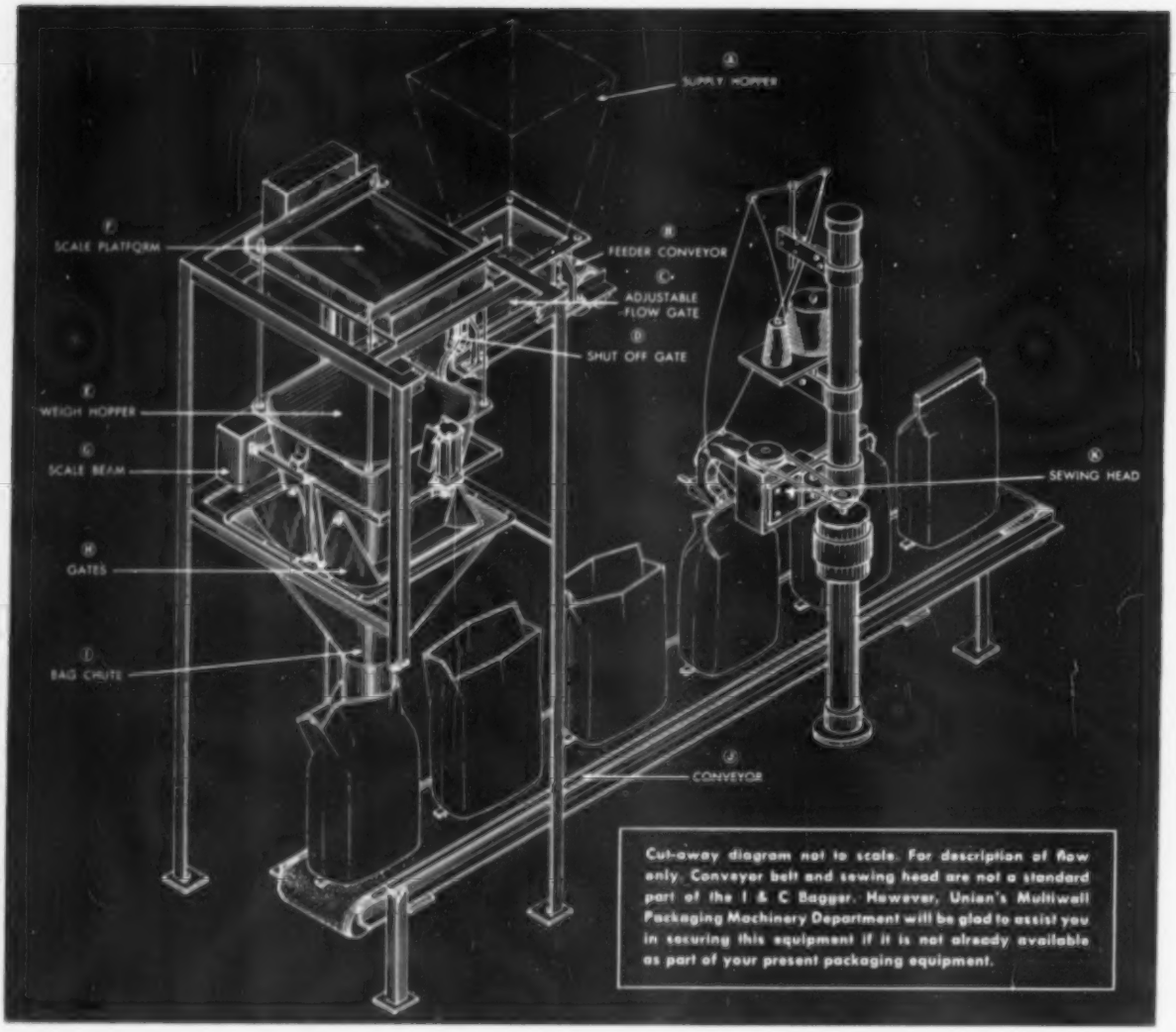
NOW! UNION BAG OFFERS


A SUPPLY HOPPER
B FEEDER CONVEYOR
C ADJUSTABLE FLOW GATE
D SHUT OFF GATE
E WEIGH HOPPER
F SCALE PLATFORM
G SCALE BEAM
H GATES
I BAG CHUTE
J CONVEYOR
K SEWING HEAD
Cut-away diagram not to scale. For description of flow only. Conveyor belt and sewing head are not a standard part of the I & C Bagger. However, Union's Multiwall Packaging Machinery Department will be glad to assist you in securing this equipment if it is not already available as part of your present packaging equipment.

OPERATION IS SIMPLE AND PRACTICALLY FOOL-PROOF

MATERIAL to be packaged flows from supply hopper (A) to feeder conveyor (B) which carries material to weigh hopper (E). Adjustable flow gate [located at (C) but not shown] regulates amount of material which feeder conveyor carries. This controls speed of filling cycle.

Weigh hopper (E) is suspended from scale platform (F). When material fed into weigh hopper reaches weight set on scale, the scale platform actuates scale beam located in box (G).

Scale beam sets off a system of synchronized switches which stop the feeder conveyor (B), lower a shut off gate [located at (D) but not shown] on the weigh hopper end of the feeder conveyor. This prevents any excess material from dribbling into weigh hopper, insuring accurate weight. Switch also opens gates (H) at bottom of weigh hopper. Pre-weighed material drops through filling spout (I) into bag.

With weight removed from scale, scale beam (G) now actuates synchronized switches in reverse order. Simultaneously gates (H) to weigh hopper (E) close . . . shut off gate (D) raises . . . and feeder conveyor (B) starts up and begins next filling cycle.

Bag is held on filling spout (I) by hand. As material drops quickly through spout into bag, filled bag drops onto a moving conveyor belt (J). This belt carries bag through sewing head (K) to complete packaging cycle.

I&C Bagger

Automatic Weighing and Filling Machine for Open Mouth Bags

FASTEST AUTOMATIC BAGGER

MUCH-DISCUSSED I & C BAGGER WEIGHS AND PACKS FREE-FLOWING, NON-BRIDGING MATERIALS AT SPEEDS UP TO 20 100-LB. MULTIWALLS A MINUTE!

DOLLAR FOR DOLLAR, the new Inglett & Corley Bagger, sold exclusively by Union Bag, is the most efficient and practical unit for accurate, high speed weighing and packing of free-flowing, non-bridging materials.

The I & C Bagger processes 400 to 500 tons in an eight hour day. Its filling and weighing cycle is completely automatic. Weight tolerance is close: in continuous runs, the machine can and does pack to within 4 ounces per 100 lb. bag.

LOWEST COST AUTOMATIC OPEN MOUTH BAGGER

Total cost of the I & C Bagger, with conveyor and sewing head, is more than 25 per cent below any comparable unit, and the I & C has a packing rate 25 per cent greater than any other open mouth packer.

WORKS WELL WITH ALL SIZES OF OPEN MOUTH BAGS

Changeover from one weight to another takes only the few minutes needed to change the scale beam balance. The I & C Bagger handles any open mouth bag, paper or textile, from 10 through 200 lb. weights.

NEEDS ONLY TWO OPERATORS

The I & C Bagger pre-weighs and packs with only one operator plus another man on the sewing equipment. Unskilled labor can be used; men require a minimum of training and supervision.

INSTALLED AND OPERATING IN TWO DAYS OR LESS!

Only 5′ x 5′ floor space, 8′ headroom over conveyor needed. Factory trained personnel will make installation, if desired, at actual cost.

DELIVERY PRIORITIES BASED ON RECEIPT OF ORDER

For quickest possible delivery, consult a Union Packaging Specialist now. Union can also advise you on plant layout and on whatever supplementary packaging machinery you may require.

HIGHER PRODUCTION . . .
LOWER COSTS . . .
LESS DOWN TIME . . .

Ask to see the impressive performance records the new I & C Bagger already has established in daily field use. Production jumps. Labor costs drop sharply. Down time is slashed.

Make your own comparison with any other packer. Verify for yourself that Union's I & C Bagger is more economical initially—cheaper to install—less expensive to maintain.

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Exclusive sales agents:

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Woolworth Building, New York 7, N. Y.

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Results of 1953

FUNGICIDE TESTS

SO favorable was the reception of the past reports of the American Phytopathological Society's Special Committee on Testing and Results of Newer Fungicides, (heretofore published in the Plant Disease Reporter, as summaries of results in the United States and Canada) that when that publication could no longer carry the burden, an Advisory Committee was appointed to find ways and means of gathering, assembling and publishing the data.

This committee obtained the cooperation of *Agricultural Chemicals* magazine and the National Agricultural Chemicals Association, and, through contributions from chemical companies, a revolving fund was established with the American Phytopathological Society for this purpose.

Requests for data were mailed to about 200 past and prospective contributors in North America. The response was gratifying. Seventy-five pathologists in 21 states and four Canadian provinces promptly sent in their data. This has been assembled and summarized by Dr. A. G. Newhall. Over 120 products were tested in 1953, and 41 crop plants were used.

Members of the Advisory Committee on Collecting and Disseminating Data on New Fungicide Tests:

J. W. Heuberger .....Newark, Del.
P. R. Miller .....Washington, D. C.
A. G. Newhall .....Ithaca, N. Y.
R. H. Wellman .....Yonkers, N. Y.
L. G. Utter (Chairman) Newark, N.J.

The committee expresses its sincere gratitude to the following whose confidence, encouragement and financial support have made possible this first issue under the new plan.

Agricultural Chemicals Magazine
American Cyanamid Company
California Spray-Chemical Corporation
Carbide and Carbon Chemicals Company
Ethyl Corporation
Geigy Company, Inc.
G. L. F. Soil Building Service
Grasselli Chemical Department of duPont
Hercules Powder Company
National Agricultural Chemicals Association
Rohm and Haas Company
Shell Development Company
Stauffer Chemical Company

Reprints of the entire report for 1953, appearing in January, 1954, and succeeding issues of *Agricultural Chemicals* will be available at $1.00 each from W. D. Mills, College of Agriculture, Ithaca, N. Y., following completion of publication.

Fungicides and Nemacides Tested 1953

22A (Carbide and Carbon Chemicals Co., Div. of Union Carbide & Carbon Corp.)
Grey mold, strawberry

3, 5-D (B. F. Goodrich Chemical Co.)
Late blight, tomato

162-P (Shell Chemical Corp.) (Soil fumigant) hexachlorocyclopentadiene
Root rot, strawberry
Verticillium wilt, potato

275 (Mathieson Chemical Corp.) pentachloronitrobenzene (75%)
Brown rot, apricot
Brown rot, peach
Collar rot, Dixie Runner peanut
Damping-off, cucumber
Root rot, lima bean (Fordhook), snapdragon
Rust, snapdragon

466 (Mathieson) Copper dihydrazinium sulfate
Alternaria blight, carnation
Leaf spot, iris
Powdery mildew, cucumber
Rust, china aster
Rust, snapdragon

1447 (Mathieson Chemical Corp.)
Powdery mildew, cucumber

1282 (Pennsylvania Salt Mfg. Co.)
Anthracnose, cucumber
Downy mildew, cucumber
Downy mildew, onion
Fruit rot, cucumber

48-CS-36 (Velsicol Corp.)
Grey mold, strawberry
Late blight, tomato
Scab, apple, peach fruit rot

50-CS-46 (Velsicol Corp.) Chlorinated organic mercury eradicant 33% Hg
Brown rot, apricot
Scab, apple

48-CS-73 (Velsicol Corp.)
Brown rot, fruit rot, scab, peach
Scab, apple

B622 (Ethyl Corp.) dichloro-chloroanilino triazone
Alternaria blight, carnation
Anthracnose, cucumber
Downy mildew, cucumber
Early blight, tomato
Fruit rot, cucumber
Late blight, early blight, potato
Late blight, tomato
Leaf spot, iris
Northern leaf blight, sweet corn
Rust, aster
Rust, china aster
Rust, snapdragon
Scab, apple

C.B.P. 55 (Shell) Chlorobromopropene (55%)—soil fumigant
Collar rot, Dixie Runner peanut
Verticillium wilt, potato and tomato
Root rot, lima bean, snapdragon

CM 218 Spike Spray (Pitts. Pl. Glass) a micronized sulfur + 3% Coromerc (Coromerc = 10% active mercury acetate)
Scab, rust, apple

E.F. 1182 (Carbide and Carbon) chloro dimethyl phenoxyethanol (chemotherapeutant)
Root rot, strawberry

E.F. 1207 (Carbide and Carbon) 2 norcamphanomethanol (chemotherapeutant)
Root rot, strawberry

HB 160 (Hercules Powder Co.)
Early blight, tomato
Scab, apple

He 257 (Rohm and Haas Co.)
Powdery mildew, cucumber

H.N.C. 4213
Powdery mildew, cucumber

LO 737 (Rohm and Haas)
Powdery mildew, cucumber
Fruit rot, peach

LO 738 (Rohm and Haas) ethylenebisthiuram tetrasulfide
Fruit rot, peach
Late blight, tomato
Northern leaf blight, corn
Powdery mildew, cucumber
Blue mold, tobacco

LO 765 (Rohm and Haas)
Late blight, tomato, potato

N521 (Stauffer Chemical Co.) dimethyltetrahydro-thiadiazine-thione
Root knot, tobacco
Downy mildew, spinach
Collar rot, peanut
Verticillium wilt, tomato

NP 770 (Pennsylvania Salt)
Brown rot, fruit rot, scab, peach

NP 1083 (Pennsylvania Salt)
Verticillium wilt, tomato

PP 1353 (Pennsylvania Salt)
Root knot, meadow nematode, tobacco

"Actidione" (Upjohn) = Cycloheximide 100% W/W
Leaf blight, strawberry

"Aramite" (U. S. Rubber) tert-butylphenoxy isopropyl chloroethyl sulfite
Powdery mildew, cucumber

"Arasan" (DuPont—Semesan)
Damping-off, forage crops
Damping-off, vegetables—carrot, citron, corn, dill, chard, beet, bean, cucumber, parsley, melon, pumpkin, squash, spinach, vegetable marrow

"Arasan SFX" (Du Pont—Semesan)
Bulb dip, iris

Bordeaux
Anthracnose, blackberry
Bacteriosis, walnut
Blotch, apple
Brown rot, apricot
Brown rot, lemon
Early blight, tomatoes
Late blight, early blight, potatoes
Scab, pecans
Scab, peas
Septoria spot, grapefruit
Septoria spot, orange

Captan = "Orthocide" (Stauffer, and California Spray Chemical Co.)
Angular leaf spot, cucumber
Alternaria blight, carnation
Anthracnose, raspberry
Blotch, apple
Blast, onion
Brooks spot, apple
Brown rot, apricot
Brown rot, lemon
Brown rot, peach
Downy mildew, lima beans
Downy mildew, onion
Downy mildew, spinach
Early blight, tomatoes
Late blight, potatoes
Leaf blight, carrot
Leaf spot, iris
Northern leaf blight, sweet corn
Rust, China aster
Rust, snapdragon
Scab, apple
Scab, rust, apple
Scab, peach
Seed piece decay, potatoes
Septoria spot, grapefruit
Septoria spot, orange
Stemphylium leaf blight, tomatoes

"Ceresan M" (du Pont—Semesan) ethyl mercury-p-toluene sulfonanalide
Seed rot, cotton

"Ceresan"—new improved (du Pont—Semesan) ethyl mercury-p-toluene sulfonanalide
Damping-off, forage crops

Chloropicrin ("Larvacide") (Larvacide Products)
Verticillium wilt, potatoes
Root rot, snapdragon

"COCS" copper oxychloride sulfate
Brown rot, lemon
Early blight, tomatoes
Fire blight, pear
Late blight, potaoes

"Colsul" (N. M. Bartlett Mfg. Co., Beamsville, Ontario) a 40% colloidal sulfur
Brown rot, peach
Powdery mildew, apple
Scab, apple
Scab, rust, apple

"Caloclor" (Mallinckrodt) mercuric mercurous chloride mixture
Grey mold, strawberry

"Calogreen" (Mallinckrodt) mercurous chloride
Grey mold, strawberry

"Cop-O-Zinc" (Tennessee Corp.) basic salts of Copper and Zinc (48% Cu. 5% Zn)
Downy mildew, lima beans
Late blight, potato

"Copox" (Stauffer) cuprous oxide
Powdery mildew, cucumber

"Copoxsul"
Powdery mildew, cucumber

"Copper 30"
Downy mildew, cabbage

"Copper-lime 10-90"
Downy mildew, spinach

Copper-sulfur
Downy mildew, spinach

"Copper A Compound" (du Pont) copper oxychloride
Bacteriosis, walnut
Brown rot, appricot, lemon
Septoria spot, grapefruit
Septoria spot, orange

"Coromerc" (Pittsburgh Plate Glass) a 10% active mercury acetate
Scab, rust, apple

"Cunilate 2472" (Scientific Oil Compounding Co.) a 10% copper-8-quinolinolate
Brown rot, apricot
Late blight, tomatoes

"Cunilene"
Late blight, tomatoes

"Crag 341" (Glyodin) (Carbide and Carbon) Fruit Fungicide (34%) 2-heptadecylimidazoline or glyoxalidine acetate in isopropylalcohol (341B has 30%)
Anthracnose, raspberry
Blight, carnation
Brown rot, peach
Fruit rot, peach
Leaf spot, iris
Rust, china aster
Rust, snapdragon
Scab, rust, apple

"Crag 640" (Carbide and Carbon) Copper-Zinc-Cromate complex practically the same as 658
Brown rot, apricot, lemon
Downy mildew, spinach

"Crag 658" (Carbide and Carbon) same as 640
Brown rot, lemon
Downy mildew, spinach

"Crag 5379" (Carbide and Carbon) trithia diazacyclononane dithione (75%)
Downy mildew, spinach

"Crag 5400 (Carbide and Carbon) trithiobis dimethylthioformamide—75%
Blue mold, tobacco
Brown rot, peach
Downy mildew, spinach
Late blight, tomato
Northern leaf blight, sweet corn
Scab, apple
Septoria spot, grapefruit
Septoria spot, orange

"Dowfume W85" (Dow) ethylene dibromide
Collar rot, peanut

"Dithane D14" (Rohm and Haas) nabam 19% (see also nabam)
Angular leaf spot, cucumber
Anthracnose, cucumber
Anthracnose, raspberry
Blast, onion
Brown rot, apricot
Downy mildew, cucumber
Downy mildew, lima beans
Downy mildew, onion, spinach
Early blight, tomato
Fruit rot, cucumber
Late blight, potato
Late blight, tomato
Leaf blight, carrot
Root rot, strawberry
Scab, apple

"Dithane Z-78" (Rohm and Haas) Zinc ethylene bisdithiocarbamate 65% WP
Angular leaf spot, cucumber
Anthracnose, cucumber
Blue mold, tobacco
Downy mildew, cabbage
Downy mildew, cucumber
Downy mildew, onion
Early blight, potato
Brooks spot, apple
Fruit rot, cucumber
Rust, snapdragon
Scab, apple
Scab, pecan

"Dithane" + Iron sulfate
Downy mildew, spinach

Ferbam—ferric dimethyl dithio carbamate
Blotch, apple
Scab, rust, apple
Angular leaf spot, cucumber
Anthracnose, blackberry and red raspberry
Blast, onion
Blue mold, tobacco
Downy mildew, onion
Rust, snapdragon

"Fixtan" (Ward Blenkinsop and Co., London) phenylmercury acetate—3.8% Hg
Scab, apple

Flotation—sulfur
Scab, apple

Formaldehyde liquid.
Root rot, snapdragon

Formaldehyde dust
Seed piece decay, potato

"Goodrich SDD" (sodium dimethyl dithiocarbamate)
Blight, carnation
Leaf spot, iris
Rust, china aster
Rust, snapdragon

Homemade Zinc Sulfate + copper sulfate + lime
Brown rot, lemon
Septoria spot, grapefruit, orange

"Iscothan" (Innis Speiden) dinitro capryl phenyl crotonate 15% = Karathane (Rohm and Haas)
Downy mildew, spinach
Powdery mildew, apple
Powdery mildew, cucumber

"Kolo 100" (Niagara) a sulfur-Phygon mixture (75% S)
Scab, apple

"Larvacide" (Larvacide Prod.) chloropicrin 99+%
Verticillium wilt, potato

Leffingwells Al-Cu-Fe
Septoria spot, grapefruit
Septoria spot, orange

Lime Sulfur
Anthracnose, blackberry
Powdery mildew, apple
Scab, apple

"Mag. 70 Sulfur" (Stauffer)
Anthracnose, raspberry
Brooks spot, apple
Scab, apple
Scab, rust, apple

Wettable Sulfur
Fruit rot, brown rot, scab, peach
Scab, apple

Manzate "(MEB)" (du Pont) manganese-ethylene bis dithiocarbamate
Angular leaf spot, cucumber
Anthracnose, cucumber
Bacteriosis, walnut
Blue mold, tobacco
Brown rot, apricot
Brown rot, peach
Bulb dip, iris
Dothiorella fruit rot, avocado
Downy mildew, cabbage
Downy mildew, cucumber
Downy mildew, lima bean
Downy mildew, onion
Downy mildew, spinach
Early blight, tomato
Fruit rot, cucumber
Fruit rot, peach
Late blight, early blight, potato
Late blight, tomato
Northern leaf blight, sweet corn
Scab, apple
Scab, peach

Methyl bromide
Root rot, snapdragon

"Merculine 100" (Scientific Oil Compounding Co.) 10% phenyl mercury salicylate
Brown rot, apricot
Damping-off, vegetables—carrot, chard, citron, corn, cucumber, dill, melon, parsley, pumpkin, squash, spinach, vegetable marrow

"Mercusan" (Woudhuysen) emulgate of copper salicylate — phenyl mercury salicylate
Bacteriosis, walnut

"Mercuramide" (Green Cross, Montreal) an organo mercury (50% Hg)
Scab, apple

"Mercusol" (Woudhuysen) copper resinate—phenyl mercury salicylate
Damping-off, vegetables — carrot, beet, bean, citron, chard, corn, cucumber, dill, melon, parsley, pumpkin, squash, spinach, vegetable marrow

Nabam (27%) Disodium ethylene bis dithiocarbamate
Downy mildew, cabbage
Downy mildew, spinach
Late blight, tomato, potato

"Neo-Vita"
Late blight, tomato

"Neutro-Cop" (Stauffer) (Remark Chemical Co.) 53% Cu
Brown rot, lemon

"Nirit" (Hoechst-Farbwerke-Frankfort) 1-thiocyano 2-4 dinitrobenzene (45% active)
Scab, apple

"One-Pak"
Scab, apple

"Orthocide H.L. 673" (California Spray Chem.)
Fruit rot, peach

"Orthocide" 5% dust (California Spray Chem.)
Downy mildew, onion

"Ovotran" (Dow) p-chlorophenyl-p-chlorobenzene-sulphonate (an ovicide for mites)
Powdery mildew, cucumber

"Panogen" (Panogen Inc., N. Y.) methylmercury-dicyandiamide (1.6%)
Seed rot, cotton
Vegetable damping-off, carrot, chard, citron, corn, cucumber, dill, melon, parsley, pumpkin, squash, vegetable marrow

Parzate (see also nabam and zineb)
Blast, onion
Blue mold, tobacco
Bulb dip, iris
Downy mildew, spinach
Fire blight, pear
Late blight, tomato
Rust, china aster
Rust, snapdragon
Scab, apple
Early blight, potato

"Phygon" (U. S. Rubber) 2,3-dichloro-1,4-naphthoquinone
Damping-off of vegetables, carrot, citron, corn, cucumber, dill, melon, parsley, pumpkin, squash, spinach, vegetable marrow
Powdery mildew, apple
Powdery mildew, cucumber
Powdery mildew, spinach
Late blight, potato
Scab, apple
Early blight, tomato

"Phygon XL" (U.S. Rubber) 2,3-dichloro-1,4-naphthoquinone 50%
Anthracnose, raspberry
Brown rot, apricot
Downy mildew, powdery mildew, cabbage
Downy mildew, spinach
Early blight, tomato
Root rot, strawberry
Rust, snapdragon
Scab, apple
Seed piece decay, potato

Polysulfide Compound
Powdery mildew, apple

"Purex" household sodium hypochlorite
Brown rot, peach

"Puratized Apple Spray" (Gallowhur) phenyl mercury triethanol ammonium lactate 7.5%
Scab, rust, apple

"Puratized Apple Spray" (Gallowhur) phenylmonoethanol ammonium acetate 11.5%
Scab, apple

Robertson's fungicide (copper oxide coating of a copper core)
Brown rot, lemon
Early blight, tomato, potato
Stemphylium leaf spot, tomato

"Semesan Bel" (du Pont-Semesan) mixture of hydromercuri-nitrophenol and hydromercurichlorophenol
Seed piece decay, potato

Sodium Cyanamid
Mummyberry, blueberry

"Spergon" (Chloranil) (U. S. Rubber Co.) tetrachloro-p-benzo-quinone
Downy mildew, cabbage
Downy mildew, spinach
Damping-off, forage crops and vegetables as carrots, chard, citron, corn, cucumber, dill, melon, parsley, pumpkin, squash, spinach, vegetable marrow

"Sulforon" (du Pont) a wettable sulfur
Apple, blotch

Streptomycin STS antibiotic from Streptomyces griseus
Fire blight, pear
Scab, apple

Streptomycin ST (325)
Fire blight, pear
Scab, pear

Streptomycin sulfate
Frogeye, apple
Fire blight, apple
Halo blight, bean
Scab, apple

"Tag HL 331" (Cal Spray) phenylmercuric acetate
Brown rot, apricot
Leaf blight, strawberry
Scab-rust, apple

"Techmangan" (Manganese Reduction Corp.)
Late blight, tomato
Late blight, potato

Terramycin — antibiotic from Streptomyces rimosus
Fire blight, apple
Frogeye, apple
Halo blight, bean (top crop)
Scab, apple

Tersan (du Pont-Semesan) tetramethyl thiuram disulfide
Bulb dip, iris

"Thiolutin" (Pfizer) antibiotic from Streptomyces albus
Blue mold, tobacco
Fire blight, apple
Frogeye, apple
Scab, apple

"Thiram" (U. S. Rubber)
Downy mildew, cabbage
Anthracnose, cucumber

"Tribasic" copper (Tenn. Copper Co.)
Angular leaf spot, cucumber
Downy mildew, lima bean
Early blight, potato
Late blight, tomato

"Vancide F995" (Vanderbilt) manganese dimethyl dithiocarbamate and 2 mercaptobenzothiazol
Anthracnose, Pythium fruit rot, cucumber
Downy mildew, bean, cabbage, cucumber
Scab, apple
Scab, Rhizopus fruit rot, peach

"Vancide F956" (Vanderbilt) Ferric dimethyl dithiocarbamate and 2 mercaptobenzothiazol
Scab, Rhizopus fruit rot, peach
Blue mold, tobacco

"Vancide 51" Sodium salts of dimethyldithiocarbamic acid and 2- mercaptobenzothiazol—30% active
Blast, onion
Blue mold, tobacco
Bulb dip, iris
Brown rot, peach
Collar rot, peanuts
Damping-off, vegetables
Downy mildew, lima bean
Early blight, tomato
Scab, apple

"Vancide 51ZW" Zinc salts of Vancide 51
Anthracnose, cucumber
Blast, onion
Brown rot, apricot
Brown rot, peach
Downy mildew, cabbage
Downy mildew, cucumber
Early blight, tomato
Fruit rot, cucumber
Early blight, tomato
Fruit rot, cucumber
Late blight, potato
Scab, pecan

"Vancide 51 + Zn" (Vanderbilt) sodium dimethyl dithiocarbamate + $ZnSO_4$
Downy mildew, lima bean
Downy mildew, cabbage
Leaf blight, carrot
Blast, onion

"VC-1-13" (Va. Car. Chem. Co.) a neutral ester of phosphorothioric acid
Root knot, meadow nematode, tobacco

Wettable Sulfur
Brown rot, peach
Powdery mildew, apple, cucumber
Scab, peach, apple

"Yellow Cuprocide" (Rohm and Haas)
Bacteriosis, walnut
Dothiorella fruit rot, avocado
Downy mildew, onion

"Zerlate" (du Pont) (see also Ziram)
Angular leaf spot, cucumber
Brown rot, apricot
Bull's-eye rot, apple
Downy mildew, onion
Early blight, tomato
Scab, peas
Scab, pecan
Septoria spot, grapefruit
Septoria spot, orange
Stemphylium leaf spot, tomato

"Zn-Cu-Fungorex"
Brown rot, lemon

"Zinc Coposil" (Cal Spray) Zn 19%, Cu 19%
Brown rot, lemon

Zineb—zinc ethylene bis dithiocarbamate
Blight, carnation
Early blight, tomato
Downy mildew, onion, spinach
Late blight, tomato, potato
Leaf spot, iris
Rust, china aster
Rust, snapdragon
Scab, apple
Stemphylium leaf spot, tomato

Zineb dust (6½%) (Geigy)
Downy mildew, onion
Powdery mildew, cucumber

Ziram—zinc dimethyl dithiocarbamate
Blight, carnation
Brown rot, peach
Leaf spot, iris
Rust, china aster
Rust, snapdragon

1953 *Cooperators*

ALABAMA: James A. Lyle.

CALIFORNIA: Joseph M. Agawa, E. C. Calavan, T. A. De Wolfe, Harley English, J. B. Kendrick, Jr., L. J. Klotz, W. D. McClellen, J. T. Middleton, W. A. Thorn, T. B. Williamson and G. A. Zentmyer.

NORTH CAROLINA: C. J. Nusbaum and F. A. Todd.

SOUTH CAROLINA: Wm. M. Epps, H. H. Foster, T. W. Graham, R. J. Higdon, C. L. Holdman and J. H. Riley.

CONNECTICUT: Saul Rich.

DELAWARE: W. R. Comyges and J. W. Heuberger.

FLORIDA: Robert A. Conover, A. H. Eddins, R. R. Kincaid and George D. Ruehle.

GEORGIA-FLORIDA: John R. Cole.

IDAHO: J. W. Guthrie and J. M. Raeder.

IOWA: W. F. Buchholtz and H. L. Lantz.

LOUISIANA: N. L. Horn.

MAINE: M. T. Hilborn.

MARYLAND: F. S. Beecher, C. E. Cox, J. G. Kantzes, H. Rex Thomas and W. J. Zaumeyer.

MICHIGAN: Donald Cation, R. H. Fulton, Walter Toenjes and Wm. J. Young.

NEW HAMPSHIRE: J. D. Bilbruck, R. Eggert, A. E. Rich and H. V. Toko.

NEW YORK: Robert C. Cetas, A. W. Dimock, A. G. Newhall, D. H. Palmiter, Wm. E. Paugstat, M. N. Rogers, J. P. Ross, R. E. Segall and C. E. Williamson.

OKLAHOMA: L. S. Morrison and F. Ben Struble.

OREGON: J. R. Kienholz and Paul W. Miller.

PENNSYLVANIA: Fred Lewis.

VIRGINIA: A. B. Groves.

WASHINGTON: Charles J. Gould, O. V. Holtzmann, Folke Johnson, C. G. Shaw and Roderick Sprague.

CANADA: G. C. Chamberlain, (Ontario); J. F. Hockey, (Nova Scotia); R. G. Ross, (Nova Scotia); D. L. McIntosh, (British Columbia); C. V. G. Morgan, (British Columbia); J. E. Swales, (British Columbia); G. E. Woolliams, (British Columbia), and V. R. Wallen, (Ottawa).

Vegetables

Bean (Top Crop)

Halo blight (Bacterial). Beltsville, Maryland. W. J. Zaumeyer and H. Rex Thomas. Three applications at weekly intervals in field and greenhouse with small power sprayer. Streptomycin sulfate .1% gave complete control of halo bacterial blight under field conditions. In the greenhouse, Terramycin also controlled halo blight when used as a dip at .1% concentration (1000 ppm).

Lima Beans (Regular Fordhook)

Downy Mildew *(Phytophthora phaseoli)*. Riverhead, Long Island, New York. Robert C. Cetas. Small field plots sprayed 8 times between June 18 and August 19. Plots were inoculated on August 4. Harvesting done the last of August. Parathion used in all applications. Application rate 125-150 gallons per acre. Vancide believed not worth further trial on downy mildew.

Fungicides	Ave. No. pods per plot	Percentage of pods			
		Healthy	Downy Mildew	Gray Mold	Other Defects
None	649	44.6	36.9	3.4	15.1
Tribasic copper sulfate	4-100 653	73.8**	11.6**	2.9	11.7
Cop-O-Zink	4-100 666	75.8**	5.1**	4.8	14.3
Manzate	2-100 654	72.7**	7.1**	7.9**	12.3
Captan 50:W	2-100 680	71.0**	8.9**	4.0	16.1
Dithane D 14 + $ZnSO_4$	2⅝-100 697	69.7**	10.2**	6.8*	13.3
Liquid Vancide + $ZnSO_4$	2⅝-100 702	57.4**	21.6*	4.8	16.2

* Difference between no fungicide and fungicide treatments significant at 5% level.
** Difference between no fungicide and fungicide treatments significant at 1% level.
† Includes losses due to other diseases and severe red spider damage.

Cabbage (Glory of Enkhuisen)

Downy Mildew *(Peronospora parasitica)*. Charleston, South Carolina. William M. Epps. In the fall of 1952 field plots were dusted 6 times with hand duster on a 5-day schedule. Mildew became severe late in season. Total of 140# of dust per acre was applied. No leaf injury occurred. Materials not considered worth further testing include Manzate, Dithane Z-78, Vancide 51ZW, Vancide F995W, Thiram, and Copper No. 30. "In other tests, Fermate, Zerlate, Phygon and the various coppers have all failed to control."

	(% Active)	DC	OP
Spergon	5	1	1
Spergon	10	1	2
Copper 30	4	2	
Thiram	5	2	
Manzate	4.2	2	
Vancide 51-ZW	6.0	3	
Vancide F995W	6.0	3	
Dithane Z-78	3.9	4	

Cabbage

Downy Mildew (*Phytophthora parasitica*). Hastings, Florida. A. H. Eddins. In a comparison of dusts and sprays carried on in seedling plant beds with tractor operated sprayer or duster, applications were made 3 times each week. Chloranil as a spray at 4 lbs. or as a 5% stabilized dust was preferred over the other materials listed. Sprays were applied at 80-150 gallons per acre and dusts at 15-35 lbs. per acre, depending on size of plants.

Sprays	lbs.-100 g.	DC	PS
Chloranil (48% wettable)	4	1	2
"	2	2	2
50% Stabilized Chloranil	2	2	2
Nabam (27%)-zinc sulfate	2-1	2	1
Phygon XL-N (50%)	1	3	2
Manzate (70%)	1½	3	2
Dusts			
12% Chloranil		1	2
5% Stabilized Chloranil		1	2

Carrots (Red Cored Chantenay)

Leaf blight (*Cercospora carotae*). Field plots sprayed June and July at Savannah, N. Y. by A. G. Newhall and Wm. E. Paugstat with 4 row rotary gear pump sprayer, 100 lbs. pressure. Applications 3, Replications 6. Cercospora leaf spot severe late in August and September.

		Yields 50 lb. bu.)
Check		924
Orthocide	2-100	1018
Vancide 51	2-1-100	1103
Dithane D14	2-1-100	1131

(L.S.D. 78) All treatments significantly better than (L.S.D. 108) check (1%) Dithane and Vancide better than Orthocide at 2 lbs. (1%), and (5%) respectively.

Cucumber (A & C)

Angular Leaf Spot (*Pseudomonas lachrymans*). Beltsville, Maryland. F. S. Beecher. Field plots were sprayed with small power sprayer on a 7-day schedule, applying 100-250 gallons per acre. Weather favorable for the disease. No copper injury from tank mixtures. Zerlate, Manzate and Orthocide 50-W not considered worth further trial against this disease. Dithane Z-78 valuable for other diseases, but of little benefit against angular leaf spot.

	lbs.-100 g.	DC	PS	OP
Tribasic	3	1	2	2
Tribasic + Dithane Z-78	3 + 2	2	2	1
Tribasic + Zerlate	3 + 2	3	2	3
Tribasic + Fermate	3 + 2	4	2	4
Manzate	2	4	2	4
Zerlate	2	6	1	—
Orthocide 50-W	2	7	3	—
Dithane Z-78	2	5	1	—

Cucumber (Palmetto)

Anthracnose (*Colletotrichum lagenarini*), **Downy mildew** (*Pseudoperonospora cubensis*), **Fruit rot** (*Pythium sp.*) Charleston, South Carolina. William M. Epps. Field plots were dusted at 5-day intervals 9 times with hand duster. Plots were inoculated with Colletotrichum. Anthracnose was measured by spotted fruit counts, and mildew by defoliation. Thiram and 1282 were thought too unpleasant to use to be worth further trial. Vancide 51 ZW slightly inferior to Dithane for second year. Further tests were warranted with Manzate, B622, Vancide F995W, and Dithane. Dithane and Manzate will be recommended for the first time in 1954. Materials of first choice against Anthracnose are Manzate, B622, and Vancide F995W; against mildew, Manzate and B622 were best, and the last three were the least satisfactory. Against Fythium, the first four were the most satisfactory. Penn 1282 not much better than check.

	% Active	DC A	DC M	DC P*	PS	Y	OP
Manzate	4.2	1	1	1	1	1	1
Ethyl B622	4.0	2	3	2	1	2	2
Vancide F995W	6.0	3	5	3	1	3	2
Dithane Z-78	3.9	4	2	7	1	6	2
Vancide 51-ZW	6.0	6	4	5	1	4	3
Thiram	5.0	5	6	6	1	5	4
Penn 1282	(?)	8	7	4	2	7	4
Control		7	8	8		8	

* A = Anthracnose, M = Mildew, P = Pythium fruit rot.

Cucumber (Marketeer)

Powdery mildew (*Erysiphe cichoriacearum*). Riverside, California. Middleton, Kendrick and Williamson. In another test two dustings were again made at two week intervals to field plots with hand rotary duster at 40 lbs. per acre. Ovotran again given first preference for same reason.

		DC	PS
Copoxsul	8% Cu + 15% sulfur	1	1
Ovotran	10% active	1	1
Isocthan	3% dust (43% active)	2	1
Copox	8% copper	3	1
Sulfur	15% sulfur	3	1
Aramite	4% active	4	1
Geigy	3% active	4	1
No treatment		5	1

Cucumber (Marketeer)

Powdery mildew (*Erysiphe cichoriacearum*). Riverside, California. Middleton, Kendrick and Williamson. Two dustings at two week intervals to field plots with hand rotary duster. Materials all applied at 40 lbs. per acre. Ovotran given first preference because it acts as a miticide while it also controls mildew.

		DC	PS
Ovotran	10%	1	1
Lo 737 (R & H)	7½%	1	1
Ovotran	5%	2	1
Ovotran	2½%	2	1
Isocthan	3% (.43 active)	2	1
Phygon	8% (4% active	2	1
Mathieson 466 + 1447	4% + 10%	2	5
Aramite	3%	3	1
Mathieson 466	5%	3	1
He 257 (R & H)	7½%	4	1
Lo 738 (R & H)	7½%	4	1
Geigy	4%	4	1
H.N.C. 4213	10%	4	4
No treatment		5	1

Onion (Early Yellow Globe)

Blast (*Botrytis allii*). New York. R. H. Segall. Field plots were sprayed with power sprayer giving following results:

	No. spots/leaf	Bu.
Leaf spots due to Botrytis allii		
Fermate	101**	474
Orthocide 406	72**	438*
Parzate, Liquid	62**	520
Check	257	434

* Significant increase in yield over its own check plots (5%).
** Statistically significant (1%).

Onion (Early Yellow Globe)

Blast (*Botrytis allii*). New York. A. G. Newhall and Wm. E. Paugstat. Large field plots on several farms were sprayed with power sprayers giving following yield results:

Table I

Applications 7, Replications 6, Sprayer 12 row — Elba, N. Y.

		Yields
Check		972 bags (50 lb.)
Dithane D14	2-1-100	1073 "
Vancide 51	2-1-100	1077 "

(L. S. D. 93.8) Both treatments significantly higher than check (2%). Blast came late. Dithane plots looked greener.

Table II

Applications 5, Replications 6, Sprayer 4 row, E. Aurora, N. Y.

		Yields
Check		741
Orthocide	2-100	835
Vancide 51	2-1-100	875
Dithane D14	2-1-100	938

(L.S.D. 78) All treatments better than check (5%). Dithane better than Orthocide at 2 lbs. Mildew came very late to one corner of field.

Table III

Applications 6, Replications 4, 18 row sprayer — Elba, N. Y.

		Yields
Check		1257
Liq. Parzate	2-1-100	1454
Dithane D14	2-1-100	1472

(L.S.D. 42.6) Both treatments better than check (1%). No significant difference between fungicides. Blast came in late.

Table IV

Applications 6, Replications 4, 17 row sprayer — Elba, N. Y.

		Yields
Check		1093
Dithane D14	2-1-100	1253
Orthocide	3-100	1273

(L.S.D. 55.8) Both treatments better than check (1%). No significant difference between fungicides. Dithane plots looked greener. Blast came late.

Table V

Applications 6, Replications 4, 28 row sprayer — Savannah, N. Y.

		Yields
Field I & II (early & late sown, together)		
Check		910
Vancide	2-1-100	970
Dithane D14	2-1-100	1010

(L.S.D. 47. bu.) Both better than check. Dithane may be better than Vancide? (5%). Blast came in late.

Field I & II (late sown)		
Check + Dieldrex		785
" "		917
Vancide	2-1-100	948
Dithane	2-1-100	1010

(L.S.D. 75) Check + Dieldrex lower than fungicides (5%). Dithane significantly higher than both checks, and may be better than Vancide?

Onion (Fall Planted)

Downy mildew (*Peronospora destructor*). Summerland, British Columbia. G. E. Woolliams. In small field plots 5 or 6 applications at weekly intervals were made with knapsack and small power sprayers. Dreft used as spreader at 1 lb. No materials were injurious.

	lbs.-100 Imp. gal.	DC	OP
Dithane Z-78 (6 appl.)	2	1	1
NP-1282 (5 appl.)	5	2	2
Fermate (6 appl.)	2	2	2

Onion (Sweet Spanish)

Downy mildew (*Peronospora destructor*). Walla, Walla, Washington. C. G. Shaw & O. V. Holtzmann. Small field plots were sprayed or dusted with "hand and machine" on 10-day schedule. Disease came late in the season. B-1956 and Good-

(*Turn to Page 131*)

MAJOR FERTILIZER MANUFACTURERS PROVE UDET F VALUES

To offset variations in raw materials, atmospheric conditions, plant equipment and manufacturing methods, several prominent fertilizer makers ran analyses of both UDET F treated and untreated materials over extended periods of time.*

NOW CONSISTENT USERS

Results are in, and in every instance UDET F gave better conditioned piles ex-den, and complete analysis revealed lower insolubles. Conclusive proof: In every instance, manufacturers who made these tests are now consistent users of UDET F!

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UDET F, instantly soluble, disperses completely in the mix. Permits higher absorption of ammonia.

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UDET F inhibits cake build-up and equipment fouling. Increases production through less "down" time.

UDET 90-95F — a 90-95% active granular powder.
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- Production increases range from 10% to 40%
- Efficiency of conversion to APA increases 4% to 5%

*Production facts and figures are available. Write for your copy.

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U D E T

INDUSTRY *News*

Moore Pitts Coke V.P.

Robert M. Moore has recently been made vice president-sales of Pittsburgh Coke & Chemical Company, Pittsburgh. Mr. Moore has been with the company since 1942 and has served in the capacity of general manager-sales for the last seven years. In his new position, Mr. Moore will be responsible for the general sales activities of the company. He is a graduate of Washington & Jefferson College and a resident of Rosslyn Farms.

ROBERT M. MOORE

•

AgChem Potential High

Even though agricultural chemicals have contributed highly to crop yield, the full impact and power of this potential is still in the future, according to D. L. Kent, B. F. Goodrich Chemical Co., Akron, O., in his presidential address at the seventh annual meeting of the Ohio Pesticide Institute, in Columbus, December 3-4. He continued to say that "Today it takes the yield of about 4½ acres to feed each one of us; but, as our population increases, it is estimated that in 25 years we will have only three acres on which to produce the year's food for each consumer." He also pointed out that the farmer's ability to meet the challenge of increased need for food has also been helped by mechanization of the farm, development of highly productive and hardy strains of plants, crop rotation, the use of cover crops and terracing.

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New British Pesticide

Development of a new insecticide, which reportedly protects brassica crops against flea beetle, was announced recently in London by Plant Protection, Ltd., a subsidiary of Imperial Chemical Industries.

The new insecticide, called Gammasan, is said to be effective when applied to seeds of such crops as cabbage, turnips, and kale, before planting.

•

Garden Show in Chicago

Latest developments in garden and lawn supplies will be exhibited in the Mid-West at the eighth National Garden Supply Trade Show, to be held at the Hotel Sherman, Chicago, January 11-13.

More than 3000 dealers are expected to attend the event and see displays and demonstrations staged by 186 manufacturers who will be showing their lines of new equipment and supplies. A New York show will be held February 2-4.

Pennsalt Names Donald Hope

Donald E. Hope has been appointed sales promotion assistant for the Agricultural Chemicals Department of Pennsylvania Salt Mfg. Co., Philadelphia. The appointment was announced by Arthur F. Bixby, sales manager. Mr. Hope will have responsibility for much of the sales promotion work of the department, as well as supervising sales control and sales correspondence. A graduate of Cornell University, Mr. Hope was recently technical sales representative for Pennsalt agricultural chemicals in the Northeast area.

DONALD E. HOPE

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Ga. Farm Chemical Co.

The Southeastern Chemical Corp., which will manufacture and distribute various types of crop dust, livestock sprays, disinfectants, insecticides, went into operation recently in Douglas, Ga. The firm will also carry other lines for the livestock trade.

Robert W. Harned Retires

After more than 45 years in the agricultural chemical industry, Robert W. Harned of the USDA is retiring at the age of 70. A few months ago he left his post as head of the Division of Cotton Insects, and was succeeded by K.P. Ewing. Since then, he has devoted his time to entomological writing.

Dr. Harned is one of the founders of the Cotton Insect Control Conference, which held its seventh annual meeting December, 1953, in Memphis; and served as chairman of this group for the previous six years. Appropriately, a surprise "get-together" was held at the 1953 conference, in honor of his many years of work in the field of cotton insect control.

Prior to joining the USDA in 1931, Prof. Harned was professor of zoology and entomology at Mississippi State College from 1907. While there he trained hundreds of entomologists. His students have graduated to various positions in the agricultural industry; among some of the members of his classes are H. G. Johnston of the National Cotton Council; H. T. Harris, now head of the department of entomology at Iowa State College; Jack Vernon, president of Niagara Chemical Div.; L. F. Curl, until recently head of the pink bollworm project, USDA; K. P. Ewing, who succeeds Prof. Harned as head of the USDA Div. of Cotton Insects; and J. N. Roney of the Arizona Agricultural Extension Service.

ROBT. W. HARNED

At this stage, Prof. Harned has no definite plans for the future, but hopes to continue in contact with the cotton industry

Anhydrous Ammonia Plant

Chillicothe Chemical Manufacturing Co. will begin construction on a new $17,000,000 anhydrous ammonia plant on a site near Chillicothe, Tex. Production operations are scheduled for mid-1955 or early 1956. Using natural gas as its raw material, the plant will be designed to run out some thirty tankcars of anhydrous ammonia daily.

■

Colorado Creditors Meet

Creditors of the Chemical Corporation of Colorado were to have held their first meeting in Denver on December 22, to prove their claims against the bankrupt corporation, appoint a trustee and select members of a committee of creditors.

Benjamin C. Hilliard, Jr., referee in bankruptcy, notified creditors early in December that claims of creditors filed during the time the matter of bankruptcy was under consideration will be considered as claims filed in the proceeding and no further claims need be filed by those creditors.

According to Mr. Hilliard, the final day for filing claims against the Chemical Corporation of Colorado, will be June 22, 1954.

■

54 Cotton Program Planned

Appointment of major committees to lay plans for the American cotton industry's 1954 research and promotion program was announced recently by H. A. Young, president of the National Cotton Council. The committees are scheduled to meet in Atlanta, January 28th to develop recommendations for action by the Council at their meeting Feb. 1, 2.

Chairman of the various committees are as follows: Production and marketing, Dr. C. R. Sayre, Scott, Miss.; Utilization research, Alonzo Bennett, Memphis; Sales promotion, Charles W. Shepard, Gadsden, Ala.; Foreign trade, A. E. Hohenberg, Memphis; and Trade barriers, C. G. Henry, Memphis.

N. C. Pest School Planned

A two-day program covering many phases of insect, plant disease and weed control is planned for the sixth annual Pesticide School conducted by North Carolina State College, Raleigh, January 19 and 20.

Glenn C. Klingman, N. C. State, will preside at the opening session on Tuesday. First speaker is Chancellor C. H. Bostian, followed by a number of speakers on weed control. These include "Looking at Weed Control Across the Country," by R. L. Lovvorn; "Weed Problems of the Extension Program," by W. G. Westmoreland; and "Weed Control in Cotton—Recent Developments," by Dr. Klingman. A question-and-answer session on weed control will follow these speakers.

How insecticides affect fish and wildlife will be discussed by W. P. Baldwin and J. R. Fielding.

Reports on plant disease control will dominate the afternoon program. F. A. Haasis will speak on "Disease Control in Floral Crops—Recent Research"; F. A. Todd, on "What's New in Fungicides for Tobacco Blue Mold Control"; C. N. Clayton, "Antiobiotics in Plant Disease Control"; and H. R. Garriss, Fungicide Recommendations for 1954."

The advantages and limitations of soil treatments with methyl bromide will be the subject of a talk by G. B. Lucas; "The Plant Disease Clinic," by D. E. Ellis; "Nematode Diseases, Soil Fumigation Results and Problems," by C. J. Nusbaum; and "New Developments in Application Equipment" by J. C. Ferguson, will complete the program of the first day.

Wednesday's program is to start with a talk by Dr. E. W. Constable on "Aerial Application Legislation." W. M. Kulash will continue with a discussion of "Insecticide-Fertilizer Mixtures"; while G. D. Jones speaks on "Changes in Control Recommendations for 1954." C. F. Smith is scheduled to talk on "Fruit Insect Research on Peaches and Apples"; R. L. Rabb, on "Tobacco Research"; C. H. Brett on "Vegetable Insect Research"; Mr. Kulash on

"Corn and Stored Grain Insect Research"; R. T. Gast on "Cotton Insect Research" and J. R. Dogger on "Forage Crop Insect Research."

The convention is scheduled to close with a question and answer period covering the topics discussed by the various speakers.

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New Poulsen Co. Formed

Poulsen Company, Los Angeles, has recently been organized to engage in the manufacture and distribution of equipment for fertilizer, insecticide, chemical and other related materials requiring processing and handling. The new company is exclusive manufacturer and distributor of "R.T.R." Uni-Blender Compounding and Liquid Formulating Plants. These plants have been in wide use for many years by the insecticide industry.

Administrative, engineering, manufacturing and marketing personnel—formerly associated with A. E. Poulsen & Company, which is being dissolved—compose the new company. A. E. Poulsen is president. General offices are at 5957 West Third Street, Los Angeles 36, California.

•

Film on Growing Fruit

Teamwork of the grower, fieldman and scientist in producing top-quality, disease-free fruit, is dramatized in a new 16 mm. color-and-sound motion picture "Keep America Growing . . . Quality Fruit," released recently by California Spray-Chemical Corporation, Richmond, Calif.

In production for a year, this picture shows the complete cycle of the fruit industry, from blossom time through to harvest, shipping and the dormant season, and from the orchard to the consumer's table. It shows problems of apple, peach, cherry and strawberry growers in producing fruit of top quality, with film locations in orchards, packing houses, warehouses, market, railroad and truck centers. Documentary techniques show the progress made in achieving better fruit set, healthier foliage, better color and size, better keeping quality and finish, and reduction of the problem of alternate, or biennial bearing.

R. J. ZIPSE

R. H. HODGSON

R. J. Zipse and R. H. Hodgson Join Powell

Robert J. Zipse has joined the John Powell & Company Division of Mathieson Chemical Corp. as domestic sales manager. R. H. Hodgson has also joined the organization as his assistant. Both men previously held similar positions with Geigy Chemical Company.

Loamium Denies FTC Charges

The Loamium Company of America, Harrison, N.J., has denied Federal Trade Commission charges that it has misrepresented the effectiveness of "Kem-Kut," a soil conditioner. The company told FTC that Kem-Kut is a product of the U.S. Rubber Co., sold under the trade name MH-40 (maleic hydrazide), and that its advertising claims are the same as those of the U.S. Rubber Co.

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Canadian Ag. Chem. Assn.

The first Annual Meeting and Conference of the recently incorporated Canadian Agricultural Chemicals Association will be held at the Royal York Hotel, Toronto, on Friday, 19th February, 1954.

A number of prominent speakers in the agricultural chemical field are scheduled to appear during the sessions and a banquet will conclude the program at which the Hon. J. G. Gardiner, Canadian Minister of Agriculture, will be the guest speaker.

In addition to members of the Association, anyone interested in this Conference either from Canada or the United States will be welcome to attend and should contact M. F. Anderson, Secretary, Canadian Agricultural Chemicals Association, P.O. Box 130, Montreal, Que.

Southern Weed Conf. Held

January 11-13 were the days set for the seventh annual meeting of the Southern Weed Conference, Hotel Peabody, Memphis, Tenn. The meeting program, issued in December, indicated that the conference would include a panel discussion on "Weed Control Methods and Problems from an Extension Viewpoint" and technical papers covering weed control in cotton, field crops, and along right of ways.

Members of the panel, with I. E. Miles, Mississippi Extension Service, as moderator, were to include: F. C. Elliott, Texas Extension Service; C. E. Fisher, Texas Experiment Station; V. C. Harris, U.S. Department of Agriculture; T. J. Johnson, Mississippi Extension Service; W. C. Shaw, U.S.D.A.; E. R. Stamper, Louisiana Experiment Station; and W. G. Westmoreland, North Carolina Extension Service.

The group was to elect new officers at the meeting, according to the program. Present officers are: W. B. Ennis, Jr., State College, Miss., president; W. C. Shaw, U.S.D.A., Beltsville, Md., vice-president; Glenn C. Klingman, Raleigh, N.C., secretary-treasurer; and E. G. Rodgers, University of Florida, Gainesville, secretary-treasurer elect.

Books and other Aids...

Handbook of Agricultural Pest Control

by S. F. Bailey and L. M. Smith

190 pages, 3.25 in U.S.A.

A practical handbook for the custom spray operator, the pest control operator, farm advisor, agricultural chemical salesman and field worker. This handbook covers the agricultural chemicals (insecticides, fungicides, herbicides, plant hormones and nutrient sprays, defoliants, etc.), their rates of application, useful formulas, as well as chapters on fumigation, spray machines, toxicology, dusts and dusting, aircraft, and mosquito control.

The book is pocket sized (5 x 7½ x ½ inches), bound with a flexible leatheroid cover, for convenient, practical use. It includes more than 100 tables for practical everyday use. Conversion formulas and examples illustrate application to specific uses.

Insect Control by Chemicals

by A. W. A. Brown

817 pages, price $12.50

817 pages. This text traces the relation between molecular structure and toxicity; classifies the insecticides and gives their chemical, physical properties; discusses the hazards to avoid in formulation, mixing and use of compounds; and illustrates modern application equipment, including nozzles; sprayers, blowers, etc;

The Chemistry and Action of Insecticides

by H. E. Shepard

504 pages, price $7.00

This new book gives a vast wealth of information on insecticides—their chemical, physical, and toxicological aspects. Helps the chemist determine their important applications and their effects upon insects. Gives history, commercial importance, major uses.

Covers these chemical groups: Arsenical Compounds; Fluorine Compounds, Sulphur Compounds; Copper Compounds; Inorganic Substances; Nicotine; Rotenone; Petroleum, Soaps, Creosotes; Synthetic Organic Insecticides. ...

Destructive and Useful Insects Their Habits and Control

by C. L. Metcalf and W. P. Flint

1071 pages, price $10.00

This authoritative guidebook covers hundreds of both useful and destructive insects—treating the inner and outer structure and form of general species—explaining their eating and breeding patterns, and life cycles—telling you how to recognize them in any stage of development.

Here are descriptions of more than 500 types of insect pests of the U. S. and Southern Canada. The insects are grouped in accordance with the crops, animals, or products they attack. For each insect you are given recognition marks and types of injury it does to man—enabling you to determine exactly *what* insect is damaging your crop, and supplying you with the most effective means of dealing with it.

Agricultural Chemicals
175 Fifth Ave., New York 10, N. Y.
Enclosed is payment. Please send the books checked.

- ☐ Handbook of Agricultural Pest Control—$3.25 in U. S. A., $3.75 elsewhere
- ☐ Insect Control by Chemicals—$12.50
- ☐ The Chemistry and Action of Insecticides—$7.00
- ☐ Destructive and Useful Insects—$10.00

(Add 3% sales tax in New York City)

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New AgChem Distributor

Ellery W. Jamieson was recently named president and general manager of the newly organized com-

E. W. JAMIESON

pany, Turf and Horticultural Supplies, Inc., Detroit, which will distribute fertilizers, insecticides and other agricultural chemicals as well as garden tools and allied lines to the retail trade in southeastern Michigan and northwest Ohio.

Other officers and directors of the new firm are: Philip J. Savage, Jr., treasurer; G. King, secretary; O. E. Anderson and Morville Lenover, vice-presidents and directors.

The firm will represent such concerns as Stadler Fertilizer Co., Cleveland; American Agricultural Chemical Co., Detroit; Dow Chemical Co., Midland; duPont Co., Wilmington, and many other leading manufacturers.

Mr. Jamieson was formerly president of Terminal Sales Corp., Dearborn, Mich., a distributing company.

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Davison Yearly Statement

A year-end report issued by the Davison Chemical Corp., Baltimore, indicates that the decrease in volume of fertilizers for 1943, was largely due to drought. The larger supplies available to farmers and dealers also caused a reduction in their early take of fertilizers; however, it is reported that with the approach of spring planting, there are already indications of satisfactory seasonal business, and inventory reduction is expected as the season progresses.

New products, including high analysis fertilizers and granulated forms of fertilizer, are said to be influencing the market and justifying the expenditures made in plant improvement.

•

New Liquid Seed Disinfectant

A new liquid seed treating disinfectant for small grains, flax, sorghum and cotton has been announced by Chipman Chemical Co., Bound Brook, N. J. The product is called "Mema" and is a formula of Plant Protection Ltd., London, England. It is a mercurial solution which may be used in slurry or liquid seed treaters. Mema is said to have been tested in the United States, Canada and Europe for over five years for the control of seed-borne disease, with generally satisfactory results. It will be available in all sections of the country for the spring seed treating season.

Dickinson Joins Amer. Potash

Calvin L. Dickinson, formerly plant manager of the Organic Chemicals Division of Diamond Alkali Company at Houston, Tex., has joined American Potash & Chemical Corp. as advisory engineer. He has been assigned to American Potash & Chemical Corporation's plant at Trona, Calif. Frank A. Jessup has assumed the position of safety engineer at the Trona plant.

•

Fulton Sales Force Expands

Robert J. Gigler, formerly in charge of sales of multiwall bags for Fulton Bag & Cotton Mills in northern California, has just been appointed west coast sales manager for the Multiwall Paper Bag Division. He will make his headquarters in Los Angeles. H. Vance Kindt succeeds Mr. Gigler in charge of multiwall bag sales in northern California.

INDUSTRY MEETING CALENDAR

January 11 — 8th National Garden Supply Trade Show, Hotel Sherman, Chicago, Illinois.

January 11-13—Seventh Southern Weed Conference, Hotel Peabody, Memphis.

January 13 and 14 — Eighth Annual Insect Control Conference with Industry, sponsored by University of Wisconsin, Loraine Hotel, Madison, Wisc.

January 14 & 15—Fourth Annual Louisiana Insect Control Conference, Hotel Bentley, Alexandria, La.

January 19-20 — North Carolina's Sixth Annual Pesticide School, N. C. State College, Raleigh, N. C.

January 20-22 — Western Cooperative Spray Project, Imperial Hotel, Portland, Oregon. (Open meeting is held during the last half day of session)

January 21-22, 1954 — Illinois Custom Spray Operators' Training School, University of Illinois, Urbana.

January 25-27 — Cotton States Branch, ESA, Buena Vista Hotel, Biloxi, Mississippi.

January 25-29 — Eighteenth annual Pest Control Operators' Conference, Purdue University, Lafayette, Indiana.

January 29 — Colorado Agricultural Chemicals Association, Cosmopolitan Hotel, Denver.

February 1-4 — Joint meeting of Southwestern Branch meeting of ESA and Southern Agricultural Workers, Hotel Adolphus and Hotel Baker, Dallas, Texas.

February 2-4 — National Garden Supply Trade Show, 71st Infantry Regiment Armory, New York City.

February 17-19 — Mid-Western Chapter, National Shade Tree Conference, Lasalle Hotel, Chicago.

February 19 — Canadian Agricultural Chemicals Assn., Royal York Hotel, Toronto.

February 19 — Midwest Soil Improvement Committee, Palmer House, Chicago.

February 23-25 — Plant Pest Control Conference of the Agricultural Experiment Station of the Alabama Polytechnic Inst., Auburn, Ala.

March 7-9 — Fertilizer Section, Southern Safety Congress, Louisville, Ky.

March 8-12 — Annual Meeting, American Mosquito Control Association, Inc., Atlantic City, N. J.

March 24-26 — National Agricultural Chemicals Association Spring Meeting, Shamrock Hotel, Houston, Texas.

March 24-27 — American Chemical Society, Municipal Auditorium, Kansas City.

March 25-26 — North Central States Branch ESA, Hotel Paxton, Omaha, Neb.

A. O. Kuhn New NEWCC President

Newly elected officers: Secretary-treasurer, W. C. Jacob, Cornell Univ., Ithaca; President, A. O. Kuhn, Univ. Md.; vice-president, J. D. Van Geluwe, Grange League Federation, Ithaca.

THE eighth annual meeting of the Northeastern Weed Control Conference was held January 5 to 7 at the Hotel New Yorker, New York City with a series of reports on new herbicides, future of this group of products, and the action of these compounds. W. C. Shaw, USDA, Beltsville, Md., presented to the attendance of more than 500 members and guests, a summary of the first national meeting, held December 8-10 in Kansas City. The group voted in favor of forming a national membership association . . . the final decision to be made by the representatives of the various regional sections.

Election of officers and presentation of various awards highlighted the business sessions of the conference. A. O. Kuhn, Univ. of Md., was elected president, succeeding R. H. Beatty, American Chem. Paint Co., Ambler, Pa.; J. D. Van Geluwe, Grange League Federation, Ithaca was elected vice president; and W. C. Jacob, Cornell Univ., Ithaca, re-elected secretary-treasurer. R. D. Sweet of Cornell Univ., Ithaca, was elected as the Northeastern Conference member to the editorial board.

L. I. Jones, USDA Extension Service, Washington, D. C., presented the award for outstanding service to the industry to N. J. Smith, assistant county agricultural agent, Madison County, N. Y. A series of five awards for the most valuable and interesting papers submitted to the association for 1953 were presented to the following: J. W. Brown, Camp Detrick, Frederick, Md., for the report "Studies on Entry of 2,4-D into Leaves." (Co-authors: R. L. Weintraub, J. N. Yeatman, J. A. Thorne, and J. R. Conover); S. L. Dallyn, L. I. Vegetable Research Farm, Riverhead, N. Y., for his report on "The Effect of Soil Organic Matter Levels on Several Herbicides;" L. L. Danielson, Virginia Truck Exp. Station, Norfolk, for his report on "Experimental Use of Herbicides Impregnated on Clay Granules for Control of Weeds in Certain Vegetable Crops;" W. E. Chappell, Virginia Agricultural Exp. Station, Blacksburg, for the paper, "Cultural vs Chemical Weed Control in Soybeans;" and A. H. Fletcher, who received the award for John H. Ruskin on the latter's report "Public Health Significance of Ragweed Control Demonstrated in Detroit."

A. O. Kuhn, newly elected president appointed the following committee chairmen for 1954: Program, W. W. Smith, Univ. of New Hampshire; Coordinating, L. L. Danielson, Virginia Truck Exp. Sta., Norfolk; Publications, R. J. Aldrich, Rutgers Univ.; Membership, C. Hovey, Eastern States Farmers Exchange, W. Springfield, Mass.; Public Relations, R. A. Peters, Univ. of Conn.; and R. H. Beatty, American Chemical Paint Co. as chairman of the Awards committee.

Award winners for most valuable and interesting papers: S. L. Dallyn, L. I. Vegetable Research Farm, Riverhead, N. Y.; W. E. Chappell, Virginia Agricultural Exp. Sta., Blacksburg, Va.; L. L. Danielson, Virginia Truck Exp. Sta., Norfolk, Va.; R. H. Beatty, retiring president, American Chemical Paint Co., Ambler, Pa.; C. E. Minarik, editor of Weeds, Camp Detrick, Frederick, Md.; A. H. Fletcher, Dept. of Health, Detroit; and J. W. Brown, Camp Detrick, Frederick, Md.

Davey Opens Service Center

Davey Tree Expert Co. opened a new fully equipped technical service center in Kent, Ohio, last month. The two-story brick structure affords accommodations for the training program which the company operates as well as offices; a laboratory for pathological work and study of plant specimens, diseases and pests; sales conference and meeting rooms, etc. The laboratory includes rooms for demonstrating tree surgery and biological work to supplement lectures and outdoor instruction. Homer L. Jacobs, technical director, is in charge of the center, assisted by Frank Lancaster, specialist in tree care problems, and William A. Jeffers, specialist in chemical brush control.

Hoffer Receives Award

Dr. George N. Hoffer, midwest manager of the American Potash Institute, recently received the Holbert Medal Award for significant contributions in the field of the plant sciences. The medal was presented at a dinner meeting at Illinois State Normal University, and by J. R. Holbert, Funk Bros. Seed Co.

•

Pennsalt Consolidates Activities

George B. Beitzel, president of the Pennsylvania Salt Manufacturing Co., Philadelphia, announced recently the consolidation of its personnel and public relations activities under the direction of F. C. Abbott, manager of personnel and labor relations. The redesignated office will be known as the office of Industrial Relations.

•

New Fumigation Tanks

A new steel tank, designed especially for use with soil fumigation gravity applicators is being made by Vulcan Steel Container Co., Birmingham, Ala., according to an announcement by G. D. Zuck, president. The tank has a capacity of four gallons.

Canners Discuss Foods

Food marketing, food procurement, merchandising, etc, are scheduled to be discussed at the 47th annual convention of the National Canners Association in Atlantic City, January 23rd. The meeting will last through Jan. 25th

•

Dedicate Bollworm Center

An open house to dedicate the federal-state-industry Pink Bollworm Research Center is to be held in Brownsville, Texas, January 24. Dr. Byron Shaw, administrator of the Departments of Agricultural Research Service, will be the principal speaker. Gov. Allen Shivers of Texas will also participate, as well as representatives of the Agricultural Experiment Stations, Extension Directors, National Cotton Council, State Commissioners of Agriculture and the Mexican Dept. of Agriculture. Dr. F. C. Bishopp is coordinator of pink bollworm research.

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Miller Preparing New Bill

Rep. A. L. Miller (Rep. Neb.) is reported to be preparing a new bill, to be submitted to the current session of Congress, dealing with federal controls on the use of pesticides on food. He indicated it has been drafted following a series of conferences this past summer between members of the insecticide industry and F.D.A. officials, and that it meets some of the F.D.A. objections to a similar measure proposed last year.

•

St. Regis Promotes Two

Two recent appointments have been announced by St. Regis Sales Corporation, subsidiary of St. Regis Paper Co. Charles A. Woodcock, vice-president of the subsidiary, has been named general sales manager for multiwall bags in the United States; and Frank W. Myers, Jr., also a vice-president of the sales corporation, will succeed Mr. Woodcock as the midwestern district of the multiwall packaging division. Mr. Myers was formerly assistant sales manager.

•

Dauler Heads Neville Co.

Election of Lee V. Dauler as president and D. W. Kelso as vice president, was announced by Neville Chemical Co., Pittsburgh manufacturers of solvents and chemicals, January 1. Mr. Dauler formerly was vice president. Mr. Kelso retains his post of treasurer.

Edwin Hodge, Jr., formerly chairman of the board and president, continues as chairman and John C. Bane, Jr., continues as secretary and assistant treasurer.

W. F. Eberle and R. E. Dingleberg were elected assistant secretary and assistant treasurer respectively.

L. V. DAULER

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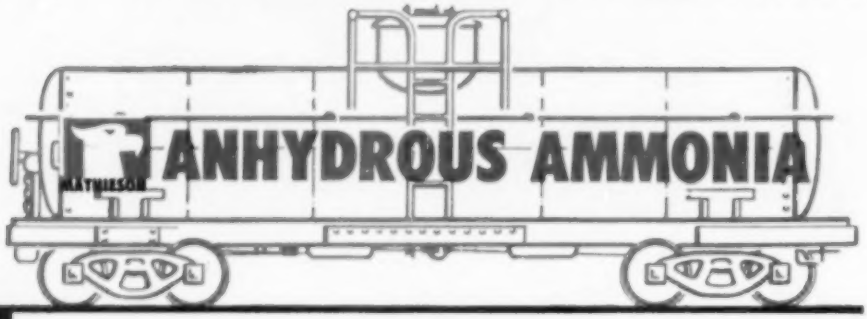

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Ill. Spray School Jan. 21-22

The sixth Custom Spray Operators' Training School will be held January 21-22 at the Illini Union on the University of Illinois campus, Urbana, Illinois. A convention of the Agricultural Spraying Association and the Illinois Aerial Applicators' Association will precede the school, meeting January 20th, also at the Illini Union Bldg.

The training school will open with an address by W. D. Murphy, assistant professor of agricultural extension. Among the reports scheduled for the meeting are: "Pre-emergence Sprays on Crops" by R. J. Smith, Univ. of Ill.; "New Agricultural Chemicals" by F. W. Slife, and C. W. Kearns, both of the Univ. of Ill.; "Herbicidal Storage Problems" by L. L. Coulter, Dow Chemical Co., South Haven, Mich.; "Liquid Fertilizers" by A. J. Ohlrogge, Purdue Univ., and Wendell Bowers, Univ. of Ill.

K. P. Buchholtz, Univ. Wisc., Madison, will report on "Herbicides on Small Grains"; J. H. Bigger, Illinois Natural History Survey, Urbana, will discuss "Field Crop Insect Pests"; while W. N. Bruce, Illinois Natural History Survey, Urbana, will report on "New Developments in Fly Control," and Norman Gannon, Illinois Natural History Survey, Urbana, will discuss "Control of Corn Earworm."

H. B. Petty, extension specialist in entomology is in charge of program arrangements.

•

Mathieson Personnel Changes

The following personnel changes in its Agricultural Chemicals Division have been announced by Mathieson Chemical Corporation: Three sales representatives promoted: R. H. Dorsett to administrative assistant in the Sales Service Department at Little Rock, Ark.; J. W. Murphy to district sales supervisor with headquarters at Jackson, Miss.; and C. S. Schoolfield to assistant sales manager, Baltimore, Md. O. L. Robertson, chief irrigation mechanic, becomes irrigation service representative at Williamston, N. C., and D. R. Stoneleigh, associate director of agricultural market development, named agricultural specialist for the Commercial Development Division in Baltimore.

Thomas Warren joins the division as a salesman in Williamston, N. C. New field sales representatives are Earl Abbott, Decatur, Ill.; Lee Hays, Richmond, Ind.; and Paul Marshall, St. Louis, Mo.

•

OMPA Okayed for Cotton Use

The systemic insecticide, octamethylpyrophosphoramide (OMPA), has just been approved for use in the control of aphids and mites on cotton, according to Monsanto Chemical Co., St. Louis, sole American producer. The decision was based on results of more than two years of detailed tests which indicated that edible products derived from cotton sprayed with OMPA at recommended dosages are free from harmful residues. A technical bulletin describing OMPA is available from Monsanto's Organic Chemicals Division.

•

Oregon Fert. Conf. July 20-22

The fifth annual Fertilizer Conference of the Pacific Northwest Plant Food Association, Portland, Oregon, will be held at Klamath Falls, Oregon, July 20, 21 & 22, 1954. A. R. Halvorson, Klamath Falls Experiment Station, is program chairman. Details of the program will be announced at a later date.

NEVSOLV 200

Boiling Range	195°C (383°F) to 260°C (536°F)
Specific Gravity	.890 to .915
Color	Straw

NEVSOLV 30

Boiling Range	130°C (266°F) to 190°C (374°F)
Specific Gravity	.835 to .845
Color	Water White

These NEVSOLVS are active solvents for DDT, BHC, 2-4-D esters, etc., and are especially clean with good odor.

Neville's new NEVSOLV series is ideally adapted to the insecticide and herbicide solvent field.

These two popular grades have individual characteristics, but other boiling ranges are available to meet your requirements.

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C. S. M. A. Honors Allethrin Discoverers

MELVIN Fuld, president of Fuld Brothers, Baltimore, Md., was elected president of the Chemical Specialties Manufacturers' Association at the group's 40th annual meeting held December 7 & 8 at the Mayflower Hotel, Washington, D. C. Mr. Fuld succeeds Clarence L. Weirich, C. B. Dolge Co., Westport, Conn.

For their work in synthesizing various organic insecticides, most notable of which is allethrin, the CSMA's 1953 awards went to Drs. Milton S. Schecter and Frederick B. LaForge, both U. S. Department of Agriculture scientists.

All segments of the chemical specialties industry stand to have a good year in 1954, the new president said. Barring war, he indicated that many branches of the industry will increase production and that more attention to aerosols is likely to be paid by industrial and professional applicators of pesticides.

John D. Conner, Washington attorney and C.S.M.A. counsel, told of plans for establishing a small business division within the Federal Trade Commission to assist industry in understanding policies of the commission.

A number of U.S.D.A. representatives appeared on the program, including Dr. Hamilton Laudani; S. A. Hall, R. N. Nelson, Frank H. Babers, and E. L. Griffin. The latter spoke on problems involved in regulatory work before passage of the Federal Insecticide, Fungicide and Rodenticide Act of 1947; also touching on some of the current problems involved.

•

Calspray Advances Julian Rice

Promotion of Julian A. Rice to assistant manager, Merchandising Sales—East, has been announced by California Spray-Chemical Corporation, Richmond Calif. Formerly supervisor of merchandising sales in the company's Eastern Division, Mr. Rice will headquarter at the company's Washington, D. C. office.

A native New Yorker, Mr. Rice is a 1940 graduate of Columbia, with a degree in Business Administration. Previous experience includes employment with the Department of Agriculture and Procter and Gamble.

•

Shell Forms New NH_3 Div.

Shell Chemical Corporation, New York, recently formed a new ammonia division in San Francisco to handle the manufacture, distribution and sale of this chemical, according to an announcement by R. C. McCurdy, president.

G. R. Monkhouse, vice president of the company, has been appointed to head the new division, while L. M. Roberts, general manager of manufacturing in the company's New York headquarters, will go to San Francisco as the new division's operations manager in charge of manufacturing, distribution, and marketing engineering.

In addition to their new duties in the ammonia division, Monkhouse and Irvine will continue as manager and sales manager, respectively, of Shell Chemical's western division which handles sales of all other Shell Chemical products.

•

Federal Expands Butler Plant

Federal Chemical Co., Louisville, Ky., announces the expansion of its Butler, Indiana, fertilizer plant, according to John V. Collis, president. This is one of six commercial fertilizer plants operated by Federal throughout the South and Mid-West. Butler is being doubled in size and completely modernized with the latest in mixing and shipping equipment.

Conveyor belts will move all materials from the time they enter the plant until the completed product moves onto the customer's truck. Semi-automatic mixing equipment will be installed and automatic valve packers will handle packaging. The Sales Service office is located at the plant site in Butler under the direction of Floyd L. Lucas.

Garman Joins APFC

Dr. Willard H. Garman, (below, left) who has served for the past five years as Experiment Station Administrator and Soil Scientist in the Office of Experiment Stations, USDA, will join the American Plant Food Council as agronomist on Feb. 1. Dr. Garman, who is 41 years old, succeeds Dr. John R. Taylor. Dr. Garman is chairman of the National Soil and Fertilizer Research Committee and also chairman of the Committee on Intersociety Cooperation, American Society of Agronomy. The appointment was announced by Paul T. Truitt, president of APFC. (right).

NACA Meets in Memphis

Reports on farmer loans, and agricultural salesmanship highlighted the December 15th meeting of the National Agricultural Chemicals Association, held at the Peabody Hotel, Memphis. The meeting of some 250 insecticide manufacturers, agricultural representatives, etc, preceded the seventh annual Cotton Insect Control Conference being held that week.

Following introductory remarks by J. Conner, Taylor Chemical Co., N. C., W. Mercer Rowe, Ashcraft Wilkinson Co., Atlanta, introduced the first speaker, C. C. Smith, National Bank of Commerce, Memphis, who discussed "Farmer Financing and Farmer Credit." According to Mr. Smith, cotton growers have done very well in 1953. The financial condition of the mid-south cotton farmer is much the same as in '52 . . . except where drought was encountered, in which case farms have been mortgaged.

Mr. Smith pointed out that it is fundamental with any production loan that the loan should be repaid out of the proceeds of the crop. The finance agency is directly concerned that the farmer have a crop to harvest, and thus is greatly interested in his plans to use insecticides to protect his crop, as well as fertilizers to bolster yield. The borrower needs to submit a budget showing his proposed expenditures by months, acreage he plans to plant, what amounts of insecticides and fertilizer he will use under normal weather conditions, and what amounts, if any, he has on hand.

The need to advise financing agencies fully of facts as to just what insecticides will and will not do and how they should be used, was brought out in the report. Mr. Smith emphasized particularly the need for dependable information as to the probable need for insecticides. He continued to say that it is just as important to give facts that show insecticides may not be needed as to show reasons why they will be needed, although, unfortunately, most salesmen are likely to show why large stocks will be needed, but reluctant to point out that smaller supplies may be sufficient. If the financing agency cannot have sound facts upon which to base its judgment, it will lose confidence in the information furnished by that source.

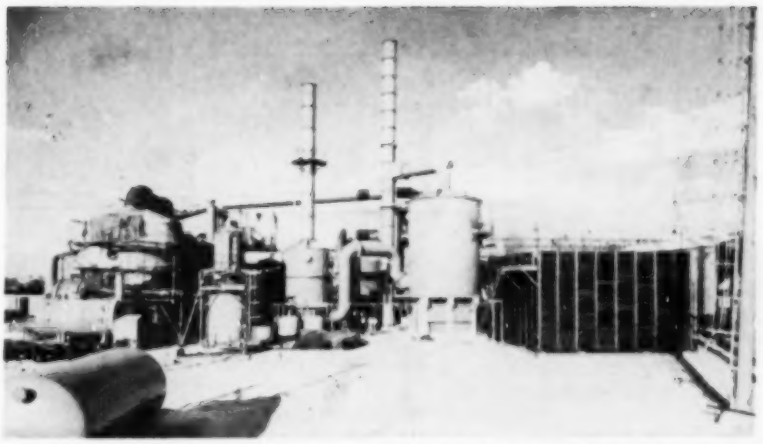
Still another important phase of this report dealt with the question of what stocks of insecticides should be carried and how they should be financed. Mr. Smith indicated that "the farmer should carry enough insecticide that will not deteriorate to make two applications over his entire crop as a matter of insurance on delivery and price." He pointed out also that if the insecticide industry gets into a practice of consigning stocks to be paid for as sold and used, "you are becoming lending agencies yourselves and become greatly interested in credits and credit risks." The distribution channels of manufacturers through dealers will have to work out a sound basis to carry reasonable supplies, and of course profit through increased price in years of demand to compensate for carrying costs plus profits.

In a report on the "Return to Good Hard Selling," Lloyd E. Partain of *Country Gentleman*, Philadelphia, reviewed sales to the farmers in recent years, and outlined a general selling program. He indicated that an intelligent approach is to first know the product, then familiarize one's self with the market, people's habits and needs, and finally plan an efficient distribution system in the territory. He stressed also the importance of educating dealers in the preparation of demonstrations which might show what a product does, how it is used, its cost and effect.

•

Launches Fertilizer Firm

A new fertilizer firm with an authorized capital stock of $100,000 has been formed at New Bern, North Carolina. Known as Grifton Fertilizer & Supply Co., the firm was incorporated by John S. Weskett and Hugh G. Swan of New Bern and Roger Johnson of Grifton, N. C.



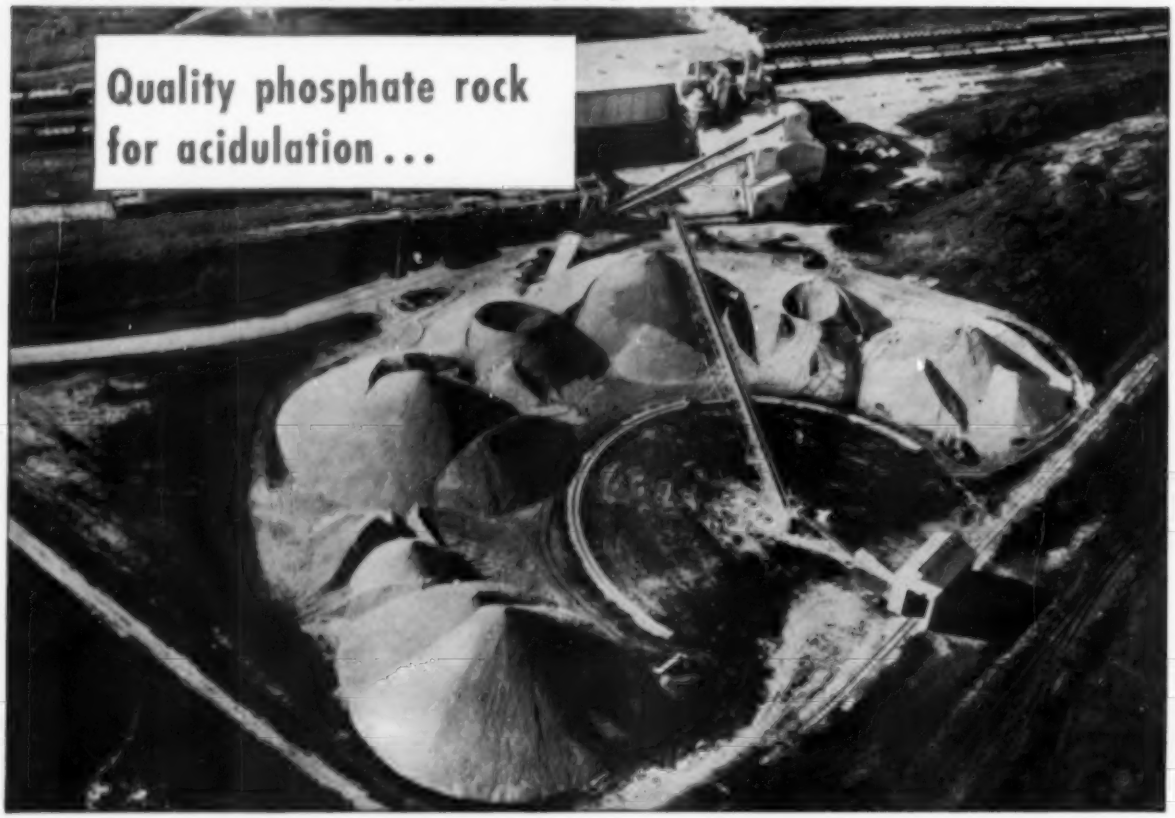
Production of sulfuric acid at Bartow, Fla., was to start early in January by The Davison Chemical Corporation as the first step in placing in operation the company's new $12,000,000 triple superphosphate plant there. Output of acid will precede the main process operation by about two weeks, the company says.

Rated capacity of the acid unit, 550 tons of 100 per cent sulfuric acid per day, will make it the world's largest unit producing this chemical, according to Monsanto Chemical Co., designers of the plant. The contact process is employed, under which sulfur is burned to give sulfur dioxide, which is converted by catalytic contact to sulfur trioxide. This is then absorbed to give sulfuric acid. Heat developed in the reaction is used to produce steam which powers many pieces of equipment in the triple superphosphate and acid plants.

Equipment of the acid unit includes molten sulfur filters; storage facilities for 8400 tons of sulfur and 6000 tons, in three tanks, of acid as 66 degrees Baume acid; a converter 39 feet high by 24 feet diameter and absorbing and drying towers 34 feet high by 24 feet diameter. The latter are of steel, brick-lined and packed.

Capacity of the triple superphosphate plant is rated at 200,000 tons annually, which is estimated to make Davison the second largest producer of this chemical.

Modern wet rock storage piles of various grades, as received from Cyanamid's outlying phosphate mines. In background, Cyanamid's Brewster, Florida, processing plant where grinding, drying, screening and loading are done.



Cyanamid offers many grades, expert technical assistance

American Cyanamid is a prime source of supply for high-grade phosphate rock, produced by the most modern processes and equipment, available in many grades to suit your requirements. Skilled technical service is available to help you solve any acidulation problems.

Washed and Dried Florida Pebble Phosphate Rock is available in bulk in the following grades, based on content of bone phosphate of lime (BPL): 77/76%, 75/74%, 72/70%, and 68/66%.

Ground Phosphate Rock is also available in the same grades as pebble rock, ground to the acidulator's requirements.

Screened Phosphate Rock (Industrial Grade). For use in electric furnaces producing elemental phosphorus, phosphoric acid and other phosphatic compounds.

Write for Free Table prepared by American Cyanamid Company for calculating acidulating formulas. Shows at a glance, in simple and concise form, how to prepare the strength of acid desired.

AERO-PHOS®

Florida Natural Phosphate

Recommended for use where it is desirable to apply phosphate directly to the soil as a soil-improvement measure. AERO-PHOS is an extremely fine-ground high-grade phosphate with either 31% or 33% P_2O_5 available in bulk and in bags. AERO-PHOS should be used to supplement mixed goods or superphosphates and is not recommended as a substitute.

AMERICAN Cyanamid COMPANY

Agricultural Chemicals Division

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HCN Fumigants
ACRYLON® Spot Fumigant
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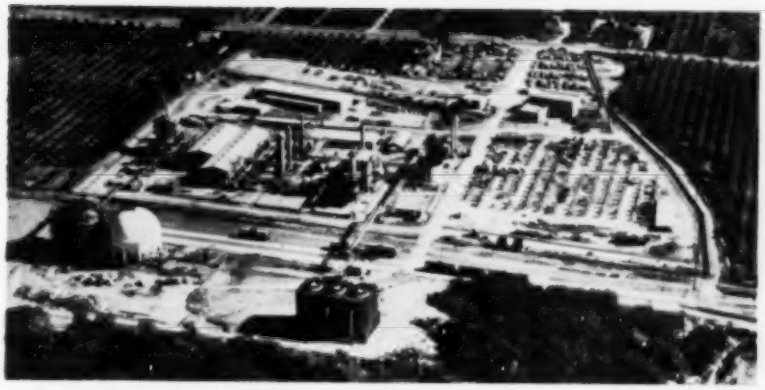

Shell Chemical's new multi-million dollar ammonia plant, (above) was opened December 11. Storage tanks in foreground, are 55 feet in diameter and each is capable of holding 2,800 tons of ammonia.

PRODUCTION of anhydrous ammonia has started flowing from the new $10 million plant of Shell Chemical Corp., at Ventura, Calif. The formal opening took place on December 11, with president R. C. McCurdy, Shell Chemical Corp., in charge. (Earlier details of Ventura plant appeared in *Agricultural Chemicals*, June, 1953)

A productive capacity of 150 tons a day is set for the new plant and a major portion of this production will be used in fertilizer in the western area. With another Shell ammonia plant at Pittsburg, Calif., the company is now the largest producer of anhydrous ammonia and ammonium sulfate, west of the Rockies.

Frank D. Kuenzly has been named manager of the new plant which will employ about 140 persons. Mr. Kuenzly, formerly superintendent of the Pittsburgh plant, is a native of Colfax, Calif., and holds a degree in chemistry from the University of California. He has been with Shell since 1934.

•

Raise Price on BHC

Columbia-Southern Chemical Corporation, Pittsburgh, has announced an increase in the carload prices of technical grades of benzene hexachloride as follows:

15% gamma 0.9¢ per gamma unit delivered; and 36% gamma 1.0¢ per gamma unit delivered.

These increases should permit resumption of needed technical services to customers, the company states. These services had been curtailed during the past season.

Niagara Chemical Division, Food Machinery and Chemical Corporation, Middleport, N. Y., has also increased its price schedule on BHC. Carload and truck load prices of technical grade benzene hexachloride, 14% gamma were advanced to 0.9 cents per gamma delivered. Less-carload shipments take the carload price plus 1 cent per pound.

•

Heckathorn on Calif. Job

Since September, when the Bureau of Entomology of the State of California assigned the contract for the Beet Leafhopper Control Program in the San Joaquin Valley to Heckathorn & Co., three separate firms have engaged in a coordinated effort to complete the work in the time allotted.

Within two days after the assignment, Heckathorn & Co. had transported from Richmond, California and set up a complete production plant in space provided by the Bankline Oil Refinery at Maricopa, California. Specifications called for the application of ½ pound of DDT in each gallon of diesel oil to be sprayed over 230,136 acres in 20 days.

"Operation Leafhopper" was designed to protect the wide range of susceptible crops from a virus spread by the leafhopper. These hoppers spread the curly top virus, a damaging plant disease which causes damage to sugar beets, tomatoes, melons, flax, and beans. They feed on Russian thistles en route to their normal winter hibernating areas. The idea was to suppress the leafhoppers before they had the opportunity to move into the hills for wintering.

Each of the six planes supplied by Farmair of Sacramento, flying from 24 emergency flight strips on the area, sprayed 700 gallons every day. The area lay along the western side of the foothills in the San Joaquin Valley from Big Panoche in Fresno County, south to and including the Edison Hills in Kern County.

To meet this schedule, it was important that materials should be available always to the applicator planes in the amount and at the time required. Heckathorn & Co. supplied 42,000 gallons of spray material every day.

To deliver the spray material, the Rumbley Trucking Company of Fresno, California was engaged. It took careful planning to meet the schedule, on landing strips in sparsely settled areas.

The work started on October 13th, and was completed on October 24th well within the contract time of 20 days. The 530,000 gallons of DDT spray material had been prepared and supplied on schedule.

Heckathorn & Co. has had previous experience with government contracts; in similar spray work last year. Before that, the company had set up a plant in Portland, Oregon and supplied the spray material for the Spruce Bud Worm Operation in the Pacific Northwest.

•

Offers Flower Pot Cleaner

Of interest to greenhouse operators is a new flower pot washer offered by Presto Manufacturing Co., Bay Village, Ohio. The device is said to remove dirt, roots and debris both inside and outside of the pots. It operates at the rate of 1,000 flower pots per hour, the makers state. Descriptive information is available from Presto Mfg. Co., 366 Bassett Rd., Bay Village, Ohio.

Versatile

MARLATE®

methoxychlor insecticide

PROVEN RESIDUAL INSECT KILLER WITH MINIMUM RESIDUE HAZARD

One of the most versatile insect killers ever discovered is "Marlate" methoxychlor. Several years of use have proved its merits: effective contact and residual action plus exceptionally low toxic hazards throughout the entire range of its usefulness.

On clover and alfalfa, "Marlate" permits dramatic increases in yield by controlling spittlebugs, leafhoppers, and other insects, without presenting any residue problems in feeding the crops to livestock.

In grain storages, "Marlate" does an outstanding job of controlling insects that infest food crops, and again it minimizes the problem of hazardous chemical residues.

On fruit crops, "Marlate" has particular advantages against the plum curculio, coddling moth, apple maggot, cherry fruit fly and cherry fruit worm. On early ripening crops especially, it has a big advantage in reducing to a minimum the residue problem.

Similarly with vegetables, "Marlate" controls the major insects on cucumbers, squash, melons and other crops.

On livestock, "Marlate" is an effective residual fly spray, and it is recommended for use on milking cows.

Around the home, in the milk house, and in the barn—this product of Du Pont research has far more uses and advantages than are normally expected of any one chemical.

On all chemicals always follow directions for application. Where warning or caution statements on use of the product are given, read them carefully.

DU PONT
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BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

Kansas Insect Conference

Kansas State College faculty members, extension workers, men from the bureau of entomology and plant quarantine from Texas, Oklahoma, and Nebraska, and others attending a recent small grain insect workers conference at Manhattan, are pictured above. From left, (front row): Jean Jacques Cartier, Reginald H. Painter, Don C. Peters, Robert Staples, Norris Daniels, and Eldon A. Cleveland. Second row: Elmer T. Jones, Akban Deededar, Herbert Knutson, William W. Gibson, Lloyd O. Warren, and Charles F. Henderson. Third row, Elbert L. Eshbaugh, Harvey L. Chada, Reynold G. Dahms, Donald Ashdown, and Robert W. Helm. Top row: Elvin W. Tilton, W. A. Baker, R. V. Connin, S. Togashi, and E. A. Wood, Jr.

Cotton States ESA to Biloxi

The annual meeting of the Cotton States Branch of the Entomological Society of America will be held at Biloxi, Mississippi in the Buena Vista Hotel, on January 25, 26, & 27, according to Dr. F. S. Arant, Branch Chairman. The program has been arranged by Dr. W. G. Eden and his committee.

Scheduled to appear on the program are Dr. H. H. Ross, president, Entomological Society of America; Paul Mayfield, president NACA; and Dr. F. C. Bishopp, in charge, Pink Boll Worm Research Project.

Numerous papers will be presented, covering entomological research progress for the area represented by the Cotton States Branch.

In addition to the paper reading sessions, a symposium will be held on "The Use of Insecticides for Control of Subterranean Insects." This Symposium will be conducted by Dr. C. F. Smith, North Carolina State College.

Others taking part in the symposium are: Dr. W. W. Kulash, North Carolina State College, who will discuss "Insecticide-fertilizer mixtures-pro and con; H. C. Young, BEPQ—"Compatability of Insecticides with Fertilizer along with notes on Results on White-fringed Beetle Control;" Dr. W. J. Reid, BEPQ—"Longevity of Insecticides in the Soil;" and Dr. J. G. Watts, Edisto Experiment Station, Blackville, S. Carolina—"The Effect of Insecticides in Soil on Plants. Phytotoxicity and Off-flavor."

•

Soil Cond. Claims Curbed

Manufacturers of chemical soil conditioners were warned recently to curb excessive advertising claims for their products or face strong state control laws. The warning came from R. C. Berry, past president of the Association of Official Agricultural Chemists at the December meeting of the Soil Conditioner Manufacturers and Distributors and the Federal Trade Commission on trade practice rules for the industry.

•

Colo. Assn. Meets Jan. 29.

The Colorado Agricultural Chemicals Asociation has announced that its annual joint meeting with the State Agricultural Clearing Committee would be held on January 29, 1954 at the Cosmopolitan Hotel in Denver. Proposed changes in the agricultural chemicals recommendations for Colorado are reviewed and discussed at these joint sessions.

Claire Titensor, president of the Colorado association, has requested that those industry people planning to attend should give advance notice to the association's secretary, W. D. Smith, P. O. Box 5510, Denver, so that adequate arrangements will be assured. Reservations are also needed for the ladies' night banquet which follows the meetings.

•

Dorr Appoints Five VP's

John V. N. Dorr, chairman and J. Delano Hitch, Jr., president of the Dorr Co., Stamford, Conn., announced recently the promotion to the vice presidential level of five senior department heads. These new officers are: F. H. Conover, Harold B. Coulter, John D. Grothe, Douglas C. Reybold, and Elliott J. Roberts. E. J. Roberts and D. C. Reybold were also elected as directors.

•

Cook, A.A.C., Passes

George Cook, Jr., 70, died at his home in Charlottesville, Va. December 10. He had been associated with the American Agricultural Company for thirty years.

•

Conservation Essay Contest

The National Grange and the American Plant Food Council are again sponsoring a Conservation Essay Contest, on the theme "Building Fertility to Cut Farm Costs." Deadline is March 31st.

•

Ray I. Mitchell has been appointed sales-service representative for the Vulcan Steel Container Co., Birmingham, Ala., according to Gordon D. Zuck, president. Mr. Mitchell is a graduate of the University of Alabama, served in the navy during World War II and has been doing special sales work since that time. Headquarters will be the main offices of the company in Birmingham.

RAY I. MITCHELL

DUVAL
High Grade Muriate of Potash!
DUVAL SULPHUR and POTASH CO.
Modern New Plant and Refinery at Carlsbad, New Mexico
Address all communications to:
ASHCRAFT-WILKINSON CO.
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Heads NACA Weed Program

A new herbicide program has been established by the National Agricultural Chemicals Association to collect and disseminate information on weeds and on the chemicals used in their control, according to Lea S. Hitchner, executive secretary of the Association.

JACK DREESSEN

The purpose of this program is to distribute to farmers, information on herbicides and crop defoliants as fast as such information arises from research.

"We want to bring to the attention of farmers the economic gains possible through the use of these chemicals. With the increased costs of farm labor and the softening of the market for commodities, we believe that weed killers and defoliants present a real potential to increase the farmer's net return."

Jack Dreessen, who has been employed to carry out the NAC herbicide program, was to join the NAC staff in Washington, D. C. January 1, 1954. Formerly Mr. Dreessen was employed by the Agronomy Department of the Oklahoma Experiment Station, Stillwater, Oklahoma.

Mr. Dreessen's duties will be to cooperate with all interested groups and individuals who work with weeds, herbicides, and defoliants and to coordinate as many activities and results of research work as is possible. Part of the duties of the herbicide specialist will be to contact experiment stations, both Federal and State, and to work with the pesticides industry, utility companies, reclamation companies and similar groups who are conducting programs for the control of weeds and brush.

Information arising from this new program will be disseminated through the Association's NAC *News*, the NAC press services, and all other outlets to reach the leaders of agriculture.

Mr. Dreessen is a graduate of Oklahoma Agricultural and Mechanical College with a B.S. in agriculture and a major in agronomy. He was an honor graduate of the Moore, Oklahoma High School and received special mention with his B.S. degree from Oklahoma A & M. He has been conducting research leading to a Masters Degree in Agronomy in the pre-emergence control of weeds and grass in cotton and has had considerable experience with the chemical control of other weeds and brush. Mr. Dreessen is junior author of two publications on this latter subject. He has represented Oklahoma A & M at the North Central Weed Control Conference for two years.

•

Higher Concentrates in Calif.

An increase of 5.2 per cent in the primary plant food content of fertilizers during the past five years has been reported by the California Fertilizer Association. According to Sidney H. Bierly, executive secretary and manager, the content five years ago was 19.6 as compared to the present average of 24.8 per cent.

Along with higher concentrations of plant food, total use of fertilizer materials and their production have likewise advanced. Last year, California and Arizona consumed some 858,302 tons of fertilizer, a significant portion of the nation's total consumption of some 22 million tons.

The CFA declares that "not only are farmers getting more plant nutrients per ton, but they are also getting fertilizer at a price that makes it one of the best farm buys. Fertilizer prices have increased less in recent years than have those of virtually any commodity bought by farmers," it says.

To Direct St. Regis Sales

Arch Carswell has been appointed to the new position of vice-president in charge of sales of all products of St. Regis Paper Co., New York, the company announced in December. He formerly was vice-president in charge of sales of the Multiwall Packaging Div. Working with Mr. Carswell in coordinating sales of all the company's products will be Edward G. Murray, vice-president-sales, Printing, Publication and Converting Paper Div.; Reginald L. Vayo, vice-president-sales, Kraft Div.; and C. Russell Mahaney, vice-president and general manager of the Panelyte Div.

ARCH CARSWELL

Mr. Carswell joined St. Regis in 1928, was named a vice-president in 1949, and was elected to the board of directors in 1952.

•

R&H Reduces "Rhothane" Price

A reduction of 5 cents a pound in the price of "Rhothane D-3," has been announced by the manufacturer, Rohm & Haas Company, Philadelphia. Effective immediately, the price is reduced from 50 cents to 45 cents a pound in carload and truckload lots, f.o.b. the company's Philadelphia plant. "Rhothane" is the original TDE-type insecticide, with toxicity to human beings and warm-blooded animals lower than that of DDT. Rhothane dusts and sprays are used by commercial growers to control a number of pests including hornworm on tobacco and tomatoes and red-banded leafroller on apples.

TIME brings changes

Yesterday's pesticides no longer get the job done. To keep pace with the times requires facilities, experience, productive capacity and sales coverage. Our long years in the chemical business have, we submit, afforded us all four. When you use Thompson-Hayward pesticides, you can be assured they are modern, honestly formulated, and that they will perform exactly as the label represents. What else can a pesticide be?

THOMPSON-HAYWARD Products

THOMPSON-HAYWARD CHEMICAL CO.

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N. LITTLE ROCK • OKLAHOMA CITY • MINNEAPOLIS • TULSA • LUBBOCK

With the Camera at Recent Convention of

California Fertilizer Association

AS was reported in the December issue of *Agricultural Chemicals* (page 49), the California Fertilizer Association elected Beverly H. Jones as president, during its 30th annual meeting at Carmel, California. At press time, however, pictures of the convention had not been received, so they are presented herewith:

Top row: Drs. William A. Albrecht, University of Missouri, Columbia; and Russell Coleman, president, National Fertilizer Association, speakers at the convention.

Second row: James M. Quinn (L), past president of the Association, presents a plaque to Earle J. Shaw, Western manager, Chilean Nitrate Sales Corp. Award was given to Mr. Shaw for his having contributed most to the welfare of the fertilizer industry in the West in 1953.

Below: Board of directors, CFA, for 1953-54: Left to right: Sidney H. Bierly, executive secretary and manager, San Marino; Howard H. Hawkins, Glendora; William E. Simas, Salinas; William E. Snyder, vice-president, Los Angeles; Murray C. McNeil, Hayward; Beverly H. Jones, CFA president, Fresno; Howard G. Conley, Berkeley; W. L. Dixon, Jr., Oakland; Jack Baker, secretary and treasurer, Los Angeles; and James M. Quinn, Los Angeles.

The Case of the Vanishing Poison

TEPP*

for pest-free, poison-free crops at lower cost

It's a murder story—with a happy ending for farmers and food packers. It's murder for red spider mites, aphids, flea beetles, thrips, leaf-hopper nymphs, cabbage caterpillars and many other pests.

But this insecticide leaves no poisonous residues on the crops or in the soil. It kills, then vanishes —within 48 hours!

TEPP is swift-acting, powerful. Fewer applications are needed and crop losses are reduced to a minimum. Crops arrive at markets or processing plants cleaner and in better condition.

Some users are saving from ⅓ to ½ of the cost of insecticides and their application by using TEPP formulations exclusively.

TEPP is available as a liquid concentrate and as a stabilized dust. It can be combined with other active ingredients.

Make sure your line includes formulations containing TEPP. For the names of manufacturers of TEPP, write to Eastman Chemical Products, Inc., Chemicals Division, Kingsport, Tennessee.

*Tetraethyl Pyrophosphate is made from triethyl phosphate—an Eastman chemical. TEPP is not supplied by Eastman Chemical Products, Inc.

Eastman
CHEMICAL PRODUCTS, INC.
KINGSPORT, TENNESSEE
subsidiary of EASTMAN KODAK COMPANY

Farmers Prosper, Survey Shows

That most farmers are still prosperous despite setbacks during the past year, is the conclusion made by Wildrick & Miller, Inc., New York advertising and sales counsellors who recently completed a market study on American agriculture.

In its report, "Farming . . . a Growing Giant", the agency declares that "the revolution in agriculture has only just begun."

Since new arable land cannot be made available at the rate required to keep America well-fed, "most of our essential increased production can come only from more efficient use of land already in production," says the study.

"This means more machines, electrical equipment, fertilizer, farm chemicals, antibiotics, better seed, improved livestock and poultry, better controls for disease, better nutrition.

In the new technology of farming, the farmer has already found many answers to the problem of making each acre produce more. "Never in the history of American farming has the farmer accepted new scientific practices so readily."

•

New Sequestrant Product

A new development in organic sequestrants has been announce by Refined Products Corporation, Lyndhurst, N.J. The new compounds, known as "Perma Kleers," are now being made available to the chemical industry.

They are stable salts of polyamino carboxylic acids and react with metal ions to form water-soluble chelates to deactivate them without removing them from solution, the company states.

Complete details about application of these sequestering agents are available from the company.

•

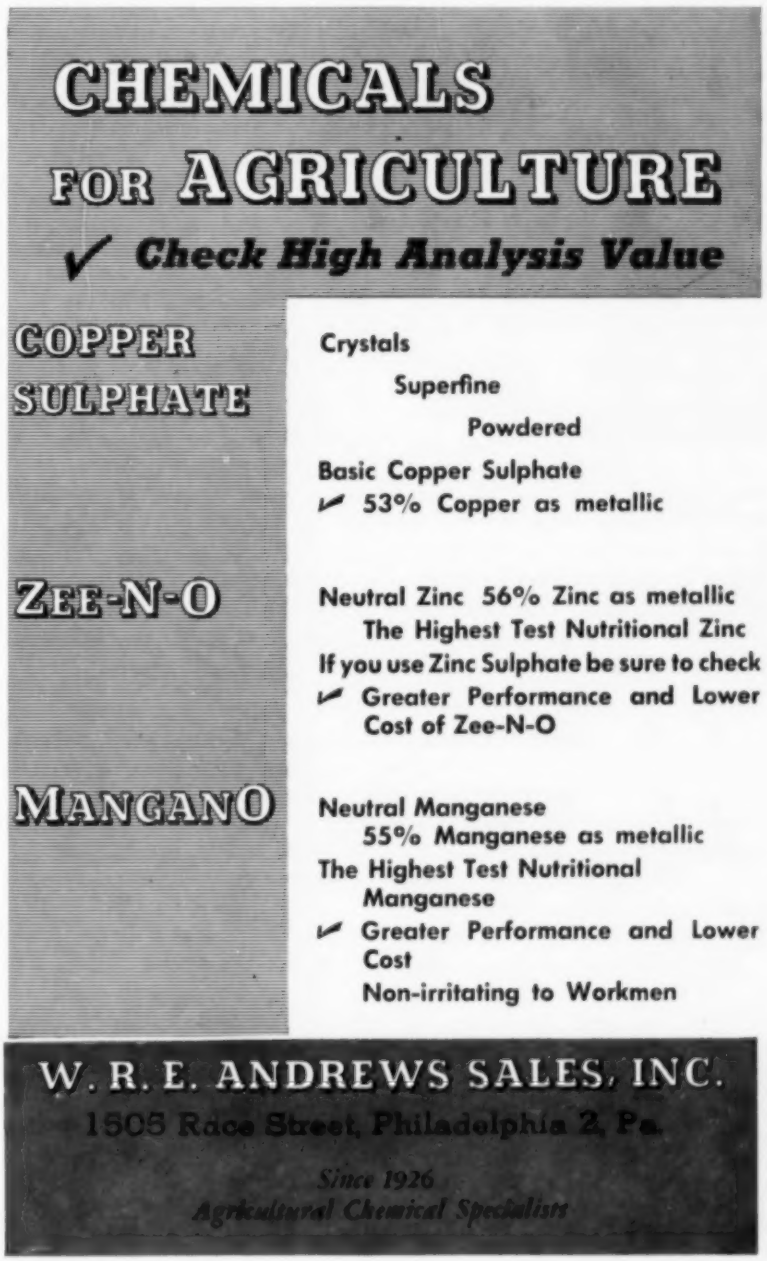
To New Quarters in Spring

Sales and executive offices of the Hudson Pulp & Paper Corp. will be moved to a new address in New York City, the company has announced. Sam Lopin, secretary, says the move will give the company occupancy of the ninth and tenth floors of 477 Madison Ave., affording some 25,000 square feet of office space. The new building is expected to be ready for occupancy this spring.

Hudson was established as a one-man bag manufacturing operation in 1900 by the late A. Mazer. It has grown consistently through the years and now employs more than 2,000 persons in its three manufacturing plants and sales offices. Sales volume for the firm was in excess of $40 million last year, Mr. Lopin says.

Laboratory Work Described

A new brochure describing its field and laboratory facilities for testing agricultural chemicals has been prepared by Dr. Wolf's Agricultural Laboratories, Hollywood, Fla. The booklet tells about soil and plant tests, soil fertility work and evaluation of agricultural chemicals done by the laboratory. Write to Dr. Wolf's Agricultural Laboratories, 2443 Johnson St., Hollywood, Fla., for a copy.



LISTENING *Post*

Issue '54 Cotton Pest Control Recommendations

This column, reviewing current insect control programs, is a regular feature of AGRICULTURAL CHEMICALS. Mr. Dorward is connected with the Division of Insect Detection and Identification, Agricultural Research Administration, Bureau of Entomology and Plant Quarantine, U. S. Department of Agriculture, Washington. His observations are based on latest reports from collaborators in the U.S.D.A.'s pest surveys throughout the United States.

By Kelvin Dorward

Cotton Pesticides

THE Seventh Annual Insect Control Conference sponsored by the National Cotton Council of America was held in Memphis, Tennessee, December 16-17, 1953. For two days prior to this conference, Federal and State entomologists and associated technical workers from 15 cotton growing states met to discuss the results of experimental work during the past year; to make control recommendations for the forthcoming season and develop plans for future research, extension and survey programs.

The accompanying table lists the principal pesticides recommended for cotton pest control together with the range of dosages per acre per application that may be used in various states. *It must be emphasized that this range does not represent the amounts used for control in each state, but is inclusive. To obtain individual state dosages, consult recommendations issued by the Agricultural Agencies within each state.*

Fall Boll Weevil Ground Trash Examinations High in Madison Parish, Louisiana

GROUND trash examinations to determine the number of boll weevils entering hibernation were completed in Madison Parish, Louisiana, early in December by the Tallulah, Louisiana, laboratory of the Division of Insects Affecting Cotton and Other Fiber Plants. Ten samples are taken at each of twenty points and examined for hibernating weevils. The number of weevils per acre per point ranged from 242 to 27,830, with the average per acre being 5,239. This is more than four times the number, 1,295, found in the 1952 fall hibernation counts and is the greatest number found in this parish since records were begun in 1936. In evaluating these figures, it must be kept in mind that weather conditions during winter and spring will be a determining factor on the number of hibernating weevils that survive. For comparison with hibernation in recent years see table (Pg. 97).

Alfalfa Plant Bug Distribution in Eastern United States

THE alfalfa plant bug (*Adelphocoris lineolatus*), which was first reported in the United States from Iowa in 1929, has spread gradually through the North Central and Midwestern States since that time. The insect was taken by Dr. H. E. Milliron of the Delaware Experiment Sta-

The Principal Insecticides and Acaricides and Recommended Rates of Application in Pounds of Technical Material Per Acre for the Control of Certain Cotton Pests[1]

Pesticides	Boll Weevil	Bollworms	Cotton Aphid	Cotton Flea-hopper	Cut-Cotton	Fall Armyworm	Grasshoppers	Lygus & Other Mirids	Cotton Leafworm	Spider Mites	Stink Bugs	Pink Bollworms	Thrips
Aldrin	0.25-0.75			0.20-0.25		0.25-0.50	0.10-0.25	0.25-0.75					0.10-0.15
Aramite										0.33-1.0			
BHC (gamma)	0.30-0.75		0.3-0.6	0.10		0.3-0.6	0.30-0.50	0.30-0.45			0.5		0.1-0.2
Calcium Arsenate[2]	7-10	10-15				1.5-2.0	0.5-1.5	1.0-1.5	7-10				
Chlordane				0.20									
Demeton			0.125-0.4				0.07-0.125	1.0-1.5		0.125-0.40			
DDT		1-2		0.5	1-2.5	0.5-1.5	0.25-0.50	0.15-0.50				2-3	0.5-1.0
Dieldrin	0.15-0.50			0.10-0.15	0.37-0.50	0.15-0.30			0.2-0.5		0.5		0.25-1.5
Endrin[3]	0.20-0.50			0.10				0.20-0.50					0.10-0.15
Heptachlor	0.25-0.75			0.20-0.25									0.10-0.15
Nicotine			0.3-0.45					0.25-0.75	0.125	0.1-0.4[5]			0.10-0.15
Parathion			0.10-0.25										
Poison Baits					6		6			20-60[5]			
Sulfur[2]													
TEPP[3,4]			0.5 Pint										
Toxaphene	2-3	2-4		1.0	2-5	2-3	1.0-2.5	2-3	1.5-2.0		6.0		0.75-1.0

[1]All materials may be applied either as dusts or as emulsion sprays unless otherwise indicated.
[2]Dust only.
[3]Spray only.
[4]40% concentrate.
[5]Does not control all species of spider mites on cotton.
[6]As recommended by state or federal agencies.

tion in that State for the first time in June of this year with specimens having been taken at lights. Although distribution is still not general throughout the Eastern States, collections during July, August and September by Drs. F. W. Poos and B. A. App of the Bureau of Entomology and Plant Quarantine gave the following new records of occurrence. In Maryland, specimens were taken in Washington, Prince Georges, Frederick, Harford, and Ann Arundel Counties. Collections were made in the Pennsylvania Counties of Fulton, Adams, Montgomery, Berks, Lebanon, and Burks. The insect was also collected in Loudon County, Virginia, Monongalia County, West Virginia, and Mercer County, New Jersey.

Fall Survey of Aphid Eggs in Maine

A SURVEY was conducted in northeastern Maine, November 2 to 10, 1953, by Federal and State Entomologists to determine the abundance of fully distended aphid eggs on the more important primary hosts of 3 species of potato-infesting aphids. Buckthorn aphid eggs on alder buckthorn were found at all sampling stations. Overall abundance of the eggs is now only about 75 per cent as large as at the same time in 1952 but nearly twice as large as the average for the preceding 10-year period. The decrease in overall abundance in 1953 resulted from unusually large numbers of eggs at one station in 1952. Present egg populations at the other stations range from about the same to twice as many as there were a year ago, and the average for these stations only is 67 per cent larger than in the fall of 1952. Present egg populations are large enough to produce potentially serious early-season populations of the buckthorn aphid in 1954.

Aphid eggs on Canada plum, a primary host of the green peach aphid, are nearly twice as abundant as they were at the same time in 1952, and slightly more abundant than the 10-year average. The percentage of thickets found to be infested also is slightly larger than in

(*Turn to Page* 124)

Year	Fall Examinations		Spring Examinations		Per-Cent Survival
	Number of Samples*	Live Boll Weevils per Acre	Number of Samples*	Live Boll Weevils per Acre	
1948-50	200	3,231	200	2,202	68
1950-51	200	4,586	200	1,742	38
1951-52	200	1,367	200	629	46
1952-53	200	1,295	200	1,149	89
1953-54	200	5,239			

* Each sample 18 square feet.

Antibiotics Tested As Foliage Sprays

This department, which reviews current plant disease and insect control problems, is a regular monthly feature of AGRICULTURAL CHEMICALS. The comments on current plant disease problems are based on observations submitted by collaborators of the Plant Disease Survey Bureau of Plant Industry, Soils, and Agricultural Engineering, U. S. Department of Agriculture, Beltsville, Md.

By Paul R. Miller

DURING the spring and summer seasons of 1952 and during the winter of 1953, greenhouse tests employing several antibiotics as foliage sprays indicated that streptomycin and terramycin were very effective in preventing fireblight infection on young Jonathan apple trees, according to H. F. Winter and H. C. Young of the Ohio Agricultural Experiment Station. In this series of experiments, young rapidly-growing trees were sprayed with dosages of 60 to 200 p.p.m. of streptomycin and terramycin on from three to five successive days. On the day of the last spray application the trees were inoculated with the causal bacterium, *Erwinia amylovora*, by needle puncture in succulent, fast-growing twigs. Trees sprayed on three or more successive days with 60 p.p.m. or more of either streptomycin or terramycin (commercial grade used) escaped infection when the twigs were inoculated on the last day of spraying. When the sprayed trees were inoculated seven days after the last spraying, 100 percent infection resulted, indicating that the effect of the antibiotic lasted less than seven days.

In the spring of 1953, streptomycin 60 p.p.m. and 120 p.p.m., terramycin 60 p.p.m. and 120 p.p.m., and "Dithane Z-78" 2 lbs. per 100 gal. were applied to bearing Jonathan apple trees as blossom sprays for the control of blossom and twig blight. "Triton B-1956," 2 oz. per 100 gallons of water, was added as a spreader to all of the sprays. The treatments were made on single-tree plots, replicated three times, and randomized.

To insure high incidence of disease, all trees were inoculated in full bloom by spraying them with a bacterial suspension made by adding 10 liters of a three-day culture of *Erwinia amylovora* in nutrient broth and 10 pounds of pyrophyllite to 300 gallons of water. The inoculation was made with a high pressure (600 lbs. p.s.i.) power sprayer.

Three applications of the antibiotics were made, the first on May 7, in early bloom; the second on May 9, in full bloom; and the third on May 14, in petal fall. Two applications of "Dithane Z-78" were made, one on May 7 and the other on May 9. The inoculation with E. amylovora was made on May 8. Very abundant infection resulted on the control trees, the first blight being seen on May 20, 12 days after inoculation. Blossom and twig counts were made on May 25, 17 days after inoculation. Natural infection during the blooming period was non-existent as was indicated on uninoculated trees nearby in the orchard. The results of this test are given in Table 1. (Pg. 99)

FLEXIBLE

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Some increase in blight after the counts were made on May 25, apparently was due to late natural infection or to spread from infections resulting from the inoculation. As of July 21, however, the streptomycin-sprayed trees were still in excellent condition, showing only a few infections. The control trees, on the other hand, were very severely blighted, with little fruit on them and with many large branches killed. "Dithane Z-78," while giving about 50 percent control of both blossom and twig blight early in the season, did not give satisfactory commercial control in this very severe test. Spread of blight was very rapid on this plot later in the season.

Although three applications of the antibiotics were made, it is believed that the third application, at petal fall stage, was of little effect in this test, since it was obvious that nearly all infection resulted from the inoculation made six days earlier on May 8.

Since in the greenhouse work the antibiotics were applied as foliage sprays and since the inoculations were made to the interior of the succulent twigs, it is believed that sufficient quantities of antibiotics were absorbed and translocated to provide temporary immunity to the fireblight bacteria. The action of the antibiotics here at least appeared to be systemic rather than as surface protectants.

TABLE 1

Fireblight control on inoculated orchard apple trees, Jonathan variety, Wooster, Ohio. 1953

Material[a]	Concentration (p.p.m.)	Percent infection[c]	
		Blossom clusters	Terminal twigs
Untreated	—	83.1	20.6
Dithane Z-78	2400[b]	44.0	9.8
Streptomycin	120	2.0	0.0
	60	7.7	0.5
Terramycin	120	9.0	0.2
	60	20.6	5.2

[a]All trees were sprayed with micronized sulfur up to and including the pink spray.
[b]Equals 2 lbs. in 100 gallons water.
[c]Counts made May 25, 17 days after inoculation. Infection was apparently all the result of inoculation as blight was entirely absent at this time on uninoculated trees.

Streptomycin Dust Used

PETER A. Ark of the University of California reports that the spring of 1953 was an epiphytotic year for fire blight in California. The blossom phase of the blight is most important. If the disease is not controlled at this stage, twigs and branches can become involved. Increase in atmospheric humidity leads to dilution of the sugar content of the pear blossom nectar, thus favoring development of *Erwinia amylovora*.

On the other hand, a drop in relative humidity tends to increase concentration of sugar in the nectary, making conditions unfavorable for the fire blight bacteria. This concept of the blight epiphytotics aided in the development of preventative measures against blossom infection at the time when the disease is likely to be greatly accelerated by wet weather.

For a number of years, both spraying and dusting of pears with copper-containing materials during blossom time has been employed by pear growers with a great deal of success. Successful control depends on proper timing, and omission of dusting or spraying at some one critical period can result in considerable blight. Depending on the weather and duration of blooming, usually five to twelve applications are made during a period of six weeks or more. However, in some situations use of copper to control fire blight results in a considerable russetting of fruit. Thus pear growers are confronted with the problem of finding a suitable material that will not russet the fruit while still controlling the blight.

In a search for new chemicals to control bacterial diseases of plants, various antibiotics were tested in the laboratory against *Erwinia amylovora*. The high degree of plant tolerance reported for streptomycin encouraged the use of this antibiotic in fire blight work. Preliminary tests showed that the blossoms of *Pyracantha yunnanensis*, apple, and pear were not injured by concentrations ranging from 30 to 400 p.p.m. when either sprayed or dusted repeatedly (four times within ten days). These concentrations produced no visible injury in tender detached shoots left in the streptomycin solutions at room temperature for two weeks. Such a remarkable degree of freedom from injury led to field trials. It was then decided to test the efficacy of crude streptomycin combined with bentonite dust.

In previous work with streptomycin, better results were obtained with the antibiotic absorbed to IRC-50 resin ground to the size of 8 microns. Later tests showed that impregnation of bentonite dust with streptomycin gave equally good results. Therefore, it was planned to use bentonite dust impregnated with streptomycin, with the final concentration of streptomycin base in the finished product equal to 240 p.p.m.

Merck and Co., Inc., Rahway, New Jersey supplied generous amounts of crude streptomycin for the tests. The Di Giorgio Fruit Corporation at Maryville cooperated in the experimental work. Three hundred and twenty Bartlett pear trees were dusted with this streptomycin dust, by means of a powerful duster having an air displacement rating of about 80,000 cu. ft. per minute. The dust was applied at the rate of 30 pounds or more per acre. Two adjoining plots of 290 and 260 Bartlett trees each were used as untreated checks. In addition, a plot consisting of 300 trees was treated with monohydrate copper sulfate dust, 20%, in lime. All plots were also sprayed twice for scab *(Venturia pyrina)* in March and twice for codling moth in April. Copper (to serve as a bactericide) was included in these sprays only in the copper plot.

Evaluation of blight incidence is based on the number of cuts made

(*Turn to Page* 120)

Technical SECTION

Report on Strobane Cotton Pest Research

AT the Cotton Insect Research and Control Conference held December 1952 in Memphis, Strobane (B. F. Goodrich Insecticide 3960-X14) was reported* as showing some promise in the control of boll weevil and cotton leaf worm.

Subsequent work with Strobane has shown it to be one of the safest of the chlorinated hydrocarbons yet developed, from the standpoint of mammalian toxicity. This is substantiated by the fact that Strobane is now registered for use in household liquid and aerosol insecticides. Furthermore, Strobane shows a range of effectiveness against certain insects not normally controlled by other chlorinated hydrocarbons.

When it became evident in the late spring of 1953 that northeast Georgia would have one of the heaviest over-wintering emergences of boll weevils in the last 25 years, it was decided that Strobane at two concentrations should be tested under field conditions in comparison with several recommended combinations. Three farms were selected in the vicinity of Athens, Ga., for these tests, owned by J. D. Hancock, M. C. Gay and H. E. Wood.

On all three farms the yield of seed cotton per acre was determined by a boll count used in determining yields in the Georgia Five Acre Cotton Contest. Over-all yields of cotton on the acreage involved in these tests were kept by each grower and this yield in bales per acre on each farm substantiated the fact that the boll counts were accurate.

Several cotton workers were consulted in planning these tests, and in view of the large number of different chemicals and combinations of chemicals available for the control of the boll weevil, it was felt that it was unnecessary to include all of the materials under test as they felt that current recommendations are about equivalent; so the summary for all three farms is based on a comparison of the 10 and 20% Strobane with the 3-5-0 or 3-5-40, and these results are given below.

Material	Yield—Lbs. Seed Cotton per Acre			
	Hancock Farm	Wood Farm	Gay Farm	Avg.
10% Strobane	1491	1126	1540	1386
20% Strobane	1739	1220	1721	1560
3-5-0 or 3-5-40	1421	1193	1515	1376

Mr. Hancock and Mr. Gay report they could see no difference in the effectiveness of either the 10% or 20% Strobane in controlling boll weevils as compared to the 3-5-0 or 3-5-40 dust. Mr. Wood did not consider the 10% Strobane as effective in controlling weevils as 3-5-40 but considered 20% Strobane more effective than 3-5-40. All three farmers agreed that Strobane dusts were easy to apply and had no disagreeable properties that are frequently encountered with other materials that they had used.

On the basis of the data obtained from these experiments, further field experimental work with Strobane in 1954 seems justified, as 10% Strobane appeared to be as effective as the current recommendations and 20% Strobane was superior in producing higher yields of seed cotton per acre than the current recommendations.

Further work against other cotton insects should be conducted with Strobane, and the 1954 experiments should be expanded to determine the lowest concentration at which Strobane will give effective boll weevil control.

*Summary of report by Friar Thompson, Athens, Ga.

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Sprays on Citrus

Fruit from trees sprayed with parathion to control scale was higher in total solids but had the same total acidity and ascorbic acid content as control fruit. Oil emulsion sprays resulted in a lower total solids content, and slightly lower ascorbic acid. *Proc. Am. Soc. Hort. Sci.* 61, 281-5 (1953).

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Surfactants for Soil Use

Studies of a new soil pore agent, surfactant PR-51, indicate that the product has no effect on soil structure, but goes to work in the soil pores themselves. It moves to the soil-water surfaces, where it speeds the movement of water. By improving soil drainage, surfactants are reported to make earlier spring plowing possible, particularly in the wet "heavy" types of soil.

In some of the heavy soils, such as silt loams and silty clay loams, improved plant growth has resulted. Drainage is increased sufficiently to permit the necessary air to enter the pores formerly blocked by water. Increases up to 18% on corn and up to 76% on tomatoes are reported.

Care is advised in the application of surfactants to the soil. It is best applied dry or in water solution, to the bare soil or to the seed bed. Application after the plants have emerged from the ground may lead to temporary stunting and burning, if concentrations in excess of the recommendations are applied.

PR-51 is water soluble and eventually leached out of the soil. Effects of the surfactant will largely

disappear in about one year in well drained soils with high rainfall. In heavier soils, the effects may persist through several growing seasons. It has little or no effect in soils without pores, such as compacted subsoils and heavy clay top soils, unless they are first treated by mulchings, or in acid soils, by liming. It is applied to the soil surface in amounts ranging from 15 to 50 pounds per acre. Report by V. J. Keenan of Atlantic Refining Co. at meeting of Soil Science Soc. and Amer. Soc. of Agronomy.

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Effect of Carriers on 2, 4-D

In a series of studies to determine the influence of various carriers upon the inhibitory effectiveness of 2,4-D sprays, four nonphytotoxic oils, Triton X-45, X-155, Dreft, and petroleum sulfonate were applied to the primary leaves of beans, and subsequent growth determined by weighing.

Highest activity was obtained with oil emulsions, as compared with slightly lower activity with surface active agents, and least activity with water. Oil carriers increased the activity of polypropylene glycol, while surface active agents did not. Neither had any effect on the activity of 2,4-D. M. Gertsch, *Weeds* 2, 33-42, 1953.

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Purple Scale Control

Parathion spray programs used were safe for trees and fruit, and the best of the programs prevented damage from purple scales.

The experiments suggest that, on grapefruit and orange trees sprayed with copper and nutritional materials, two pounds of 15 per cent wettable parathion be added to the postbloom combination spray and one pound each to the summer and fall wettable-sulfur sprays. After the first year, one pound in each of the postbloom, summer, and fall sprays will probably be sufficient for year-round control of these heavy infestations. Bulletin E-870, *Control of Heavy Infestations of Purple Scales on Grapefruit Trees*, by H. Spencer and P. A. Norman, USDA, BEPQ.

Outlook on Fly Resistance to Insecticides

by Robert J. Dicke
Univ. of Wisconsin

THE common housefly has become increasingly difficult to control on Wisconsin dairy farms during the past several years. Much of the difficulty in housefly control in other dairy areas has been attributed to insecticide failure, or more specifically to an acquired resistance in houseflies to chlorinated hydrocarbon insecticides, such as methoxychlor and lindane. On Wisconsin dairy farms, however, it appeared that insecticide failure was of relatively little importance; whereas ineffective sanitation (reduction of principal fly breeding sites) was the primary control fault. During the summer of 1953, 29 dairy farms were observed in three areas of the state in an effort to determine the degree of housefly control and the primary cause of control failures.

On the basis of these observations, there appeared to be no correlation between the degree of fly control obtained and the relative tolerance of flies for methoxychlor. Satisfactory control was obtained on two farms where fly strains were relatively resistant to methoxychlor, and failed on three farms where flies were relatively susceptible to the insecticide. Where extremely resistant fly strains occurred, one each were taken from farms with satisfactory control, fair control, and failure.

A definite correlation was evident between the degree of sanitation management and the degree of house fly control obtained. Whenever failures occurred, general sanitation was poor; and where only fair control was obtained, sanitation was also inadequate. On 80% of the farms where satisfactory control was obtained, sanitation management was adequate for suppression of extensive fly breeding. A strain of flies extremely susceptible to methoxychlor residues on farm O-10 may have accounted for the satisfactory control obtained in spite of poor sanitation in an adjacent hog yard. Sanitation within the dairy barn, however, was excellent. On the two farms where satisfactory control was obtained, but where fair sanitation was indicated, conditions in the dairy barns were excellent while general sanitation was fair in adjacent stock barns. Extensive fly breeding, however, was not observed in these barns. On one farm satisfactory control was obtained without insecticide application. On another farm, the only insecticide used was an application of lindane late in the summer to overhead beams and fixtures. Sanitation on this farm was excellent. Two applications of methoxychlor and one of malathion were required for adequate control in the dairy barn of still a third farm. Methoxychlor and repeated applications of a pyrethrum space spray, however, were unable to control flies in the hog barn where extensive breeding was observed.

Previous laboratory and field experiments have demonstrated that the insecticides employed in this study were effective for the control of houseflies which have not acquired an immunity to chlorinated insecticides. The tolerance studies reported would indicate that after two or more years of exposure to chlorinated insecticides, fly strains in the areas studied had not acquired a marked degree of resistance to them. A correlation between relative resistance and degree of control was not noted. It is definitely indicated from these observations that effective fly control cannot be obtained with insecticide applications alone, and that adequate sanitation management is mandatory for an effective control program.

On Wisconsin dairy farms, the principal sanitation fault on all but three farms where inadequate control was obtained was attributed to excessive fly breeding in box stalls confining to a small area yearling heifers and other stock. Manure accumulations in box stalls or pens are optimum breeding sites for the com-

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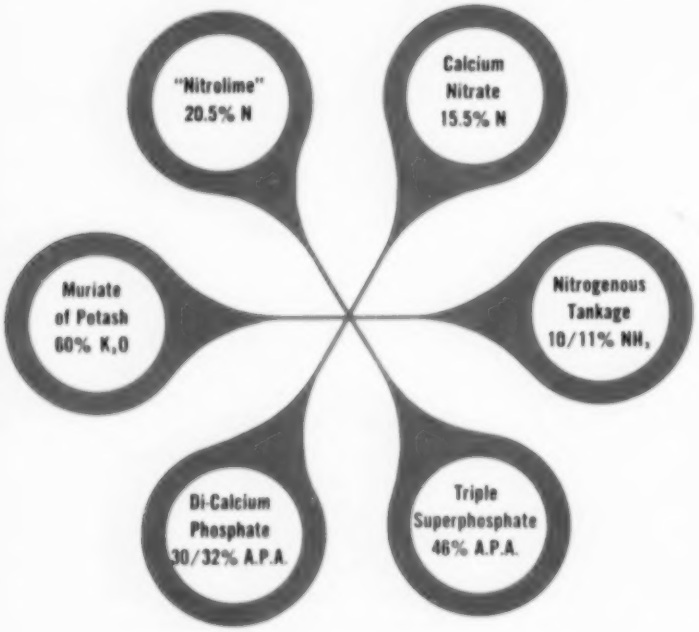
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mon housefly. Observations during this and previous field studies have indicated that weekly removal of manure from these areas has been more effective in fly control than repeated applications of residual or space spray insecticides.

Summary:

1. Housefly resistance to methoxychlor did not appear to be an important cause for control failure on Wisconsin dairy farms.

2. Effective housefly control was not obtained with insecticide application alone.

3. Adequate sanitation management appeared to be mandatory for an effective housefly control program.

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Nitrate Studies on Potatoes

A study of the comparative effects of sodium nitrate and calcium nitrate on the potato indicated superior yields, greater total salt absorption, and increased carbon absorption from the sodium nitrate plots. Greater use of potassium and improved carbohydrate metabolism are suggested as reasons for the improvement. O. Verona and A. Benvuniti *Plant and Soil* 4, 298-302 (1953).

Insecticide Combinations Recommended

A "DOUBLE-BARRELED" dose of insecticide may be one answer to overcoming insect resistance toinsecticides, according to Neely Turner, head of the Connecticut Agricultural Experiment Station Entomology Department. Mixtures of two insecticides, each of which attacks the bug population in a different way, have given excellent results in overcoming the resistance problem.

The problem of insects that no longer succumb to the insecticides which once killed them easily has come close to home, as far as Connecticut agriculture is concerned. While there is little chance that insect resistance will ever become widespread under Connecticut farming conditions, three important vegetable pests in the State have become more and more difficult to control, because of the resistance factor. These are the Mexican bean beetle, which began showing resistance to rotenone in 1951, the potato flea beetle and the cabbage worm, both of which have shown resistance to DDT since 1952.

Most difficulty has been encountered in commercial truck crop areas where pest control sprays have been applied intensively and over a sizeable area. In general farming areas, where insecticide applications have been spotty, not so much trouble has been noted. This ties in with the research finding that the larger the proportion of an insect population receiving insecticide treatments, the more likely the population is to become resistant.

The easiest solution, when a population becomes resistant to a specific insecticide, is to switch to another effective material. This answer is, at best, temporary. Laboratory experiments have shown that insects already resistant to one insecticide often become resistant to another within a very short time. By changing over to another spray material every time this happened, one would soon run out of effective chemicals to fight pests.

The Connecticut Station thinks its "double-barrelled" approach is better and a long series of experiments bear this out. By using two materials which kill insects in different ways; for example, a nerve poison and a stomach poison, resistance has been largely overcome. The insecticides can be applied alternately or as a mixture. Probably the second method is best for the commercial grower, since he doesn't have to worry about remembering which insecticide was applied at the last spray application.

Experiment Station tests have shown that a mixture of methoxychlor and dilan give very good control of the Mexican bean beetle. Several combinations have worked well against the potato flea beetle: chlordane-dilan, chlordane-aldrin, chlordane-dieldrin, and chlordane-heptachlor.

For cabbage worms, no mixture has been found yet which will do as good a job of controlling the pests as DDT did before the insects became resistant to it. However, a combination of rotenone and pyrethrum may be used and will give fair control. These materials, unlike DDT, must be used as a preventive. That is, they must be applied early in the season before the pest is well established. Put on as soon as the first cabbage worm butterflies appear, and repeated every 10 days or so until harvest, they will keep the population down quite well. The single materials, cryolite or dilan, may also be used, and seem to present no resistance problem. *Conn. Agr. Exp. Sta. Bulletin*, Dec. 1953.

Conditioners Vs Nutrient Content

Nutrient contents of crops grown on soils treated with a soil conditioner were affected significantly in greenhouse experiments reported by Dr. W. H. MacIntire, U-T Agricultural Experiment Station, at the Soil Science Society of America meeting in Dallas, Texas. The addition of the soil conditioner cause decreases in the calcium and magnesium content of and uptake by red clover and millet, and increases in uptake of potassium and sodium, as a general trend, Dr. MacIntire pointed out. The experiments were conducted with seven silt loams limed and unlimed, using different rates and placements of the conditioner.

"The results from the seven soils, as indicated by growth, and by phosphorus, calcium, potassium, magnesium, and sodium contents of and uptake by six harvests indicate considerable difference for the several soils," Dr. MacIntire reported. For example, on the Clarksville soil the rate or placement did not significantly affect growth or phosphorus content or uptake. In most cases, however, calcium content was decreased and potassium and sodium contents were increased with increasing rate of the soil conditioner,

whereas magnesium content was not affected greatly by either the rate or placement of the soil conditioner."

Dr. MacIntire's report was in the form of a paper co-authored by himself, Dr. S. H. Winterberg, A. J. Sterges, and L. B. Clements, all of whom did work on the experiments. It was part of a symposium on soil conditioners at the four-day meeting of the Soil Science Society held in conjunction with the annual meeting of the American Society of Agronomy, Crop Science Divisions, and Agronomic Education Division. Dr. Eric Winters, head of the U-T Agronomy Department, is president.

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Miss. Annual Report

The 66th annual report of the Mississippi Agricultural Experiment Station, Station College, Miss., was issued recently for the fiscal year ending June, 1953. A summary of the work done by the departments of agricultural engineering, agronomy, animal disease, entomology, horticulture, plant pathology and physiology, etc., as well as reports by the various station branches are included in this 112-page booklet.

Anhydrous ammonia applications in pasture experiments show that when applied in contact with superphosphate, a marked reduction in the effectiveness of the superphosphate is observed. It is concluded that the two fertilizers should be separated in application.

The entomology department reports that in both spray and dust tests, toxaphene and dieldrin give more effective boll weevil control than aldrin and BHC. Grain protectants used for protecting peas from attack by the cowpea weevil are effective nine months after treatment on peas stored under dry conditions. Results continue to show the need for a higher rate of pyrethrins per bushel than is recommended for grains. Aldrin, heptachlor and lindane, when used at rates of approximately ½ to ¼ gram per bushel of corn, give good control of the corn weevil on unshucked corn.

The cumulative effect of applying insecticides to vegetable crops is currently under study. Eleven chlorinated hydrocarbon insecticides are applied five times per year to each of three crops, the usual harvested portion removed and the residue turned into the soil. Soil samples from all plots are being analyzed for the accumulation of chlorine.

In weed control investigations, field-plot experiments on cotton indicate that two commercially available pre-emergence herbicides, Chloro-IPC and dinitro, are worthy of limited use by farmers on appropriate soil types. CMU has shown promise for controlling nutgrass in non-crop land. 2,4-D is reported to give fair to good control of annual weeds in corn plots. Dinitros have shown promise as pre-planting treatments for watermelon and as pre-emergence herbicides for lima and snap beans.

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Synergism Studies at Iowa

Iowa State College and U. S. Industrial Chemicals Co. Division of National Distillers Products Corporation, have entered into a cooperative project for the purpose of extending and clarifying the knowledge of synergism as it relates to insecticidal action. In these studies radioactive piperonyl butoxide will be synthesized and this C14-labelled synergist will then be used for the investigations of its biological behavior. The project is being directed by Dr. Paul Dahm, Professor of Zoology and Entomology of the College.

The interaction between piperonyl butoxide and pyrethrins represents a degree of synergism unique in that: (1) The interaction between synergist and pyrethrins is manifested at all ratios of the mixture, (2) It is effective against practically all insects in varying degrees, (3) Both the killing power and the rate of knockdown of the pyrethrins synergized by piperonyl butoxide are increased.

The use of "tagged" pyrethrins with inactive piperonyl butoxide facilitates the study of one aspect of synergistic behavior.

Retentive Toxicity of Residues

A series of tests were made with 35 persistent-residue type contact insecticides used commercially to control California citrus pests, to determine the comparative effect upon three species of entomophagous insects. Field-treated citrus leaves were brought to the laboratory for toxicity bioassay following standard periods of field weathering of residues. One coccinellid, *Lindorus lophanthae* (Blaisdell), and two parasitic Hymenoptera, *Aphytis chrysomphali* (Mercet) and *Metaphycus helvolus* (Comp.), were used as test species.

The materials most deleterious to the beneficial insects tested were DDT, parathion, lime-sulfur, TDE, EPN, and sulfur, named in decreasing order of toxicity. Aramite and *para*-chlorophenyl *para*-chlorobenzene sulphonate were practically nontoxic. Very little selectivity of the chemicals to the test species was shown, other than that expected on the basis of their comparative size and vigor. Under arid conditions, dusts were more toxic than were sprays of the same materials. B. R. Bartlett, *J. Econ. Entomology* pp 566-569, V.46, #4, 1953.

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New Concentrated Fertilizer

A new concentrated fertilizer made from air, phosphorus and ammonia, containing a total of 97 per cent plant nutrients was described by J. C. Driskell, F. A. Lensfesty and G. Tarbutton, at the December meeting of the New Orleans regional group of the American Chemical Society.

The fertilizer is reported to be made by burning phosphorus in air and combining the resulting chemical . . phosphoric oxide . . with ammonia gas. Generally, it is designed to give improved crop response and to be effective over longer periods. It is available as a white powder, containing about 17 per cent of a phosphorus compound.

Small scale greenhouse tests indicate that the product has a slight superiority over the nitrate-superphosphate mixture in residual effect. It is emphasized that the product is still in the laboratory stage.

Aldrin Sprays on Wheat

In western Kansas the main grasshopper problem has been the protection of newly sprouted fall seeded wheat from marginal damage by the second generation of *Melanaplus mexicanus mexicanus* (Sauss.) Control studies have resulted in the following recommendation:

The previous year's sorghum and wheat-stubble fields should be thoroughly worked to reduce the problem to one of marginal infestation. Then aerial spraying of the field margins, including strips up to 30 rods wide into the wheat, when most of the first-generation nymphs are still concentrated along the edges, will eliminate most of the infestation. This application should be made the latter part of May, before adults appear. The residual action of this first application will eliminate large numbers of adults as they move into the sprayed margins from the ripening and harvested wheat. The recommended dosage for this early spraying is two ounces of aldrin per acre. If done with ground equipment, the coverage is uneven and as much as 2.5 ounces per acre may be used. Aerial spraying will permit wider marginal treatment and more uniform coverage, and an average dosage of two ounces of aldrin per acre is more likely to be obtained.

A second aerial spraying of the margins should be made late in June, before egg deposition by the first generation and should eliminate all reinfestation. The dosage should be calibrated at four ounces of aldrin per acre. At this time the wheat is being harvested and farmers are too busy to think about grasshoppers, but this second spraying is essential to good control. USDA, BEPQ Bulletin E-868, November, 1953. 14 pages, by R. L. Shotwell.

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Fertilizer Granulator

The many advantages of granular fertilizer have increased the demand for this type of product. It's dustless, can be kept without caking, and does not deteriorate in seasonal storage. Granular fertilizer can be spread on windy days, is especially good for airplane distribution, and does not wash down below the roots as do pulverized fertilizers. It allows the manufacturer to spread operations over many months, instead of running two or three months a year to meet peak demands.

Eastern States Farmers' Exchange have recently converted their Wilmington, Del., mixing plant to granulation, with minimum cost. The primary changes involved installing a pug mill to serve as a feeder to the rotary dryer; the dryer was converted to a granulator dryer; and the mixer was changed.

The revised operation which gives a homogeneous product of uniform size (90 per cent on a 35 mesh screen, almost all through 14 mesh) is as follows: Superphosphate, nitrogen solution and limestone are weighed to form one ton batches in a four-minute cycle. From the weigh hopper the batch goes to a mixer, at ten per cent moisture, which it leaves at about 200° F., and drops to the pug mill which feeds it to the rotary dryer. From here the batch moves to the granulator, and then with a countercurrent flame, the moisture is brought down to 2.5%. The product is finally cooled at about 110° F. Capacity of the plant is 15 tons per hour. p. 116, December, 1953, *Chemical Engineering*.

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Plant Growth on Acid Soils

The use of large amounts of phosphate to fix aluminum ions in insoluble aluminum phosphate is suggested for barley and wheat crops in acid soils high in aluminum ions. The use of large amounts of potassium oxide-nitrogen fertilizer is also recommended. A high hydrogen-ion concentration in acid soils is detrimental to rape and poppies. Liming and, if necessary, sodium-potassium-phosphorus fertilizing is recommended for these crops.

Peas tolerate a highly acid soil only if commercial nitrogen is used. In the absence of additional nitrogen, biological nitrogen fixation soon ceases. With the increasing use of physiologically acid fertilizers, occasional liming is necessary. Through *Chemical Abstracts* vol. 47, 10163, 1953.

NEW Books

DDT and Newer Persistent Insecticides by T. F. West and G. A. Campbell. Published by Chemical Publishing Co., New York. 630 pages, 5½ x 8½ inches, cloth binding, price $8.50.

The major part of this book is devoted to the physical and chemical properties, manufacture, formulation and applications of DDT. The second part deals with other chlorinated hydrocarbons, whose insecticidal properties have been discovered recently and gives a comparison of these new insecticides with DDT.

Insecticides other than DDT discussed include BHC, chlordane, toxaphene, and to a lesser extent, Rhothane D_3, some benzene derivatives, styrene dibromide, and insecticide SK.

A chapter reviewing use of DDT against plant pests discusses the use of this insecticide against various crop, garden and fruit pests.

This book is a second edition of a text first published in England, and is the first American edition.

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A Handbook of Colorimetric Chemical Analytical Methods. Published by Tintometer Ltd., Salisbury, England. 220 pages, 7¼ x 9¾ inches, cloth binding, price $5.00.

The material in this book consists of a collection of various detailed technical instructions which have been prepared from time to time for the use of laboratory technicians who employ the Lovibond Comparator and the B. D. H. Lovibond Nessleriser. Techniques for chemical analysis, grading tests, clinical tests and toxic gases analysis are included.

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Chemical Tissue Tests for Determining the Mineral Status of Plants in the Field by D.J.D. Nicholas. Published by Tintometer Ltd., Salisbury, England. 33 pages, 5½ x 8½ inches, cloth binding, price $3.00.

This brief text gives the chemical tests for nitrate, nitrogen,

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Manures and Fertilizers A survey by the British Ministry of Agriculture and Fisheries. Published by Chemical Publishing Co., New York. 96 pages, 5¾ x 8¾ inches, cloth binding, price $2.50.

Divided into three sections: Organic Manures; Fertilizers; and Purchase and Use of Fertilizers; this text is designed to advise farmers of the best means of improving soil fertility. Sections on; the art of mixing manures and fertilizers, soil analysis, and trace elements, provide interesting information in this book.

•

Minor Elements in Citrus

Nutritional requirements of citrus, based upon the latest research findings of scientists of the Citrus Experiment Station, Lake Alfred, Fla., the United States Department of Agriculture at Orlando and other research groups in the state, were outlined by Dr. H. J. Reitz, Horticulturist, Citrus Experiment Station, at the annual citrus growers institute at Camp McQuarrie.

In a talk entitled "Present Fertilizer Recommendations," Dr. Reitz discussed the amount of each of the plant food nutrients required, based on present research knowledge, to produce a box of fruit most efficiently. His recommendations for the annual application per box of fruit capacity of the trees of the several nutrients involved are as follows: For bearing trees: Nitrogen, 4 pounds per box; phosphoric acid, none; potash, .35; magnesium oxide, .2-.4; manganese oxide, .03; copper oxide, none; zinc, 3 lbs. zinc sulfate plus lime to neutralize it (or the equivalent amount of zinc in other forms) in 100 gallons of water applied as a spray to the trees; boron, .1 to .2 of a unit of B_2O_3 in the fertilizer or 1 lb. of borax per 100 gallons as a spray; molybdenum, 1-2 ounces of sodium molybdate per 100 gallons when yellow spot is apparent in the grove.

Whether 1 ounce or 2 ounces is used should depend upon the severity of the yellow spot. To correct iron deficiency symptoms when present, use chelated iron at the rate of ⅔lb. per tree of the material containing 6 percent iron or ⅓ lb. of the material per tree containing 12 percent of the material as a soil application.—From *Citrus Magazine*, Oct. 1953.

•

Potassium in Soils

Split applications of potassium are more effective than single applications in the main agricultural soils in New York State, recent research at Cornell has disclosed. Although single applications of large amounts of potassium are easier and less costly to the farmer, more frequent treatment makes for better use of the potassium by crop plants.

In greenhouse and field experiments with Ladino clover, using three soil types: Mardin silt loam, Honeoye, and Dunkirk, it was found that the potassium content of the plant remains at a more nearly constant level with split applications than with single applications, and that it remains above the critical level for a greater part of the cropping period. The Honeoye soils maintained a more constant level of potassium than the other two.

Notes On Fruit Disease Control

Prevention of infection is highly important in fruit crops. In the case of apple scab, it is believed that lime sulfur applied as a late delayed-dormant spray still is the most effective material to prevent primary infections in susceptible varieties such as Delicious. Recent experiments with alternative procedures such as ground spraying with Elgetol, followed with organic mercury preparations were not as successful. Diffulties are encountered in this latter case if there is a prolonged period of cool rainy weather during the blossom period. The organic mercury sprays have little protective action. Growers who have combined mercury with protective fungicides (sulfur, ferbam, dichlone or glyodin) have been more successful in controlling primary scab infections.

Of some recent concern to fruit growers is the failure of captan to control scoty blotch adequately. Ultimately, it may be necessary to revert to one application of weak bordeaux mixture in the cover sprays to hold the causal fungus under control.

Blossom blight control on peaches is not always feasible in years when the blooming period is prolonged by cool weather, and is another problem of the fruit pathologist. A series of sulfur sprays during the blossom period has had a marked effect upon the number of infected peaches in Maryland orchards.

The fungus causing pear leaf blight presents a considerable problem, since it will spread through the trees and cause premature defoliation, if left uncontrolled. Ferbam sprays have shown good results in control of this problem.

The question of compatibility is still another phase of fruit disease control.

The use of organic insecticides largely precludes the use of lime containing highly alkaline fungicide preparations. This poses quite a problem to peach growers in areas where bacterial spot is prevalent. The zinc-lime mixture and parathion are not compatible. Many growers are using so-called "neutral" zinc compounds without lime, but this is not an entirely satisfactory solution. During 1953, information has accumulated that parathion adversely affects nearly all of the commonly used fungicides. To complicate the problem, it was found almost at the same time, that captan was more efficient when combined with parathion than when used with aresenate of lead and lime. Further studies of these and other problems are of course under way. Report presented at the Dec. 1953 meeting of the Kansas State Horticultural Society by Dr. J. C. Dunegan, USDA, BEPQ, Beltsville, Md.

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FARMERS

(From Page 36)

that he follow the practices that had been suggested in the past, except in such cases as those practices were clearly wasteful or inadmissable. I do believe that in the immediate future the Congress will write a prohibition upon payments for recurring practices insofar as fertilization of pastures and other soil conserving practices are concerned.

In the field of permanent farm legislation—if no law whatever is enacted, it means that we will revert to the Act of 1949 or the so-called "sliding-scale support program." Under that program, the income of most of the producers of basic commodities would be immediately reduced by about 15 percent. I do not believe that the average American farmer, and particularly the family-type farmer, can stay in business if his income is subjected to an additional reduction of 15 percent almost overnight. In my opinion, the members of the Congress will, unless some adequate two-price system is brought forward, extend the existing law at least as it relates to the basic commodities.

In our complex civilization it is very difficult for the individual farmer to plan his operations from year to year so as to avoid loss and assure him a profit. A farmer cannot turn his production on and off as you would a water spigot. After he has once prepared his soil, purchased his seed and his fertilizer and planted his crop, he is committed to harvesting it. In the industrial world, when there is overproduction, the plant can be closed down. Unemployment insurance takes care of the employees of the plant, and the owners can avoid great losses by temporary cessations of production when there is a surplus of any industrial product. It is only through some law that can enable the overwhelming majority of the farmers to cooperate together, that great losses can be avoided.

I doubt very much that we can ever have a program in this country that will guarantee a 90 percent support program for all the perishable commodities. In my opinion it would entail such great losses that the American people would demand the repeal of every law for the benefit of the farmer that is on the statute books. To undertake to support all the perishable commodities at 90 percent is clearly out of the question unless some means of controlling production can be devised. But there can, of course, be helpful support programs that do not involve a guarantee, but are limited to certain export bounties or subsidies or to limited purchases for the school lunch program, or other uses.

In the consideration of farm legislation in the next Congress, I trust that we shall be able to eliminate the political "jockeying for advantage" in the consideration of the measures that are so vital to the welfare, not only of the farmers but of all the American people. We have Democratic farmers; we have Republican farmers. In my judgment this matter is of such great consequence it should

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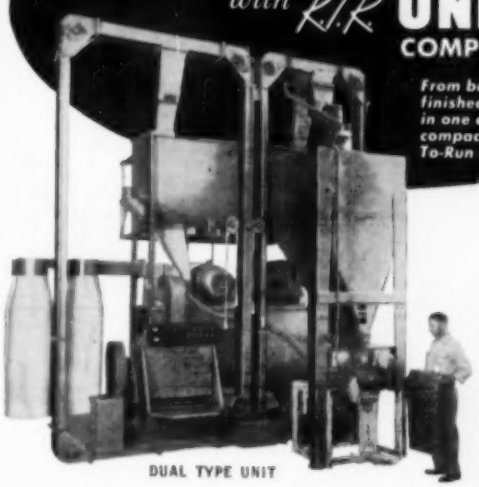

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be dealt with on a non-partisan or a bi-partisan basis rather than being kicked into the political arena with no good whatever being accomplished.

I am sure we must continue our campaign—those of us who believe that the farmer is entitled to a fair share of the national income; that we must continue our campaign to impress upon the American people the fundamental truth that we cannot have long-sustained national prosperity in the midst of a farm depression or from the bankruptcy of many of our farmers.

This nation cannot endure depression on a debt of $275 billion—the tremendous carrying charges that are entailed, the responsibilities that are ours to provide an adequate defense for America to defend the freedom of men. We must realize that that cannot be done here unless we endeavor to inspire this spirit of freedom in our allies and associates all over the world. We cannot maintain our system if we permit conditions to arise that will decrease national productivity or the national income by any considerable degree.

We all have faith in the American system and in the American Congress; in the spirit of fair play of every segment of the American people. With faith in ourselves, with determination that America shall work out her ultimate destiny, I am confident that the next Congress will see to it that laws are enacted that will enable the American farmer to exist, to enjoy a reasonable share of the greatest prosperity that any nation has ever enjoyed, thereby preventing disaster to the soil, and assuring continuation of the American way of life.★★

COTTON INSECTS

(*Continued from Page 43*)

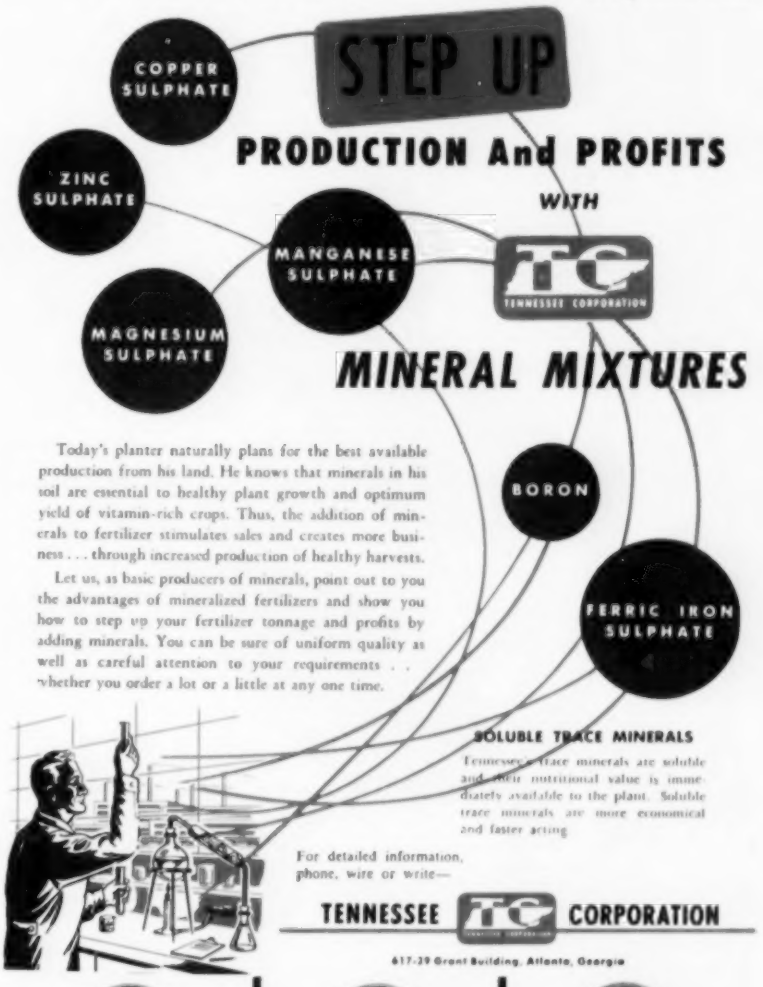
ily in direct proportion to infestation.

Calcium arsenate is not adapted to application to cotton as a spray, hence the established practice for many years has been to use the insecticide solely as a dust. Since the development of organic chemicals which could be used in either dust or spray form, it has been found that sprays are generally more advantageous. As a consequence, the percentage of liquid cotton poisons applied in the boll weevil area is now from 30 to 50 percent of the total (Table 6). (Pg. 43)

The overall proportion depends upon the level of insect control in different parts of the area because the use of sprays is more prevalent west of Alabama than in the Southwest (Table 7). (Pg. 43)

In Tables 8 and 9 are shown the distribution of cotton insecticide consumption in the boll weevil area in the 1950-53 period as compared with that of calcium arsenate from 1940 to 1943. Although the actual quantities used have increased many times, the proportion in each state was similar in both periods. Texas, for example, continues to consume about 35 percent of the materials distributed in the area.

Prior to 1947, when the arsenical compounds, mostly calcium arsenate, were the sole poisons avail-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COP-O-ZINK is a new, neutral copper-zinc fungicide containing 42% copper and 11% zinc. COP-O-ZINK gives a superior performance in control of fungus diseases. COP-O-ZINK composition of two essential elements gives it added value in correcting deficiencies of zinc and copper and in stimulating plant growth. COP-O-ZINK is compatable with all inorganic and organic insecticides. No lime is required. For use in spraying or dusting.
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able to control the boll weevil, only 5 to 10 percent of the cotton acreage in the cotton belt was treated each year. The newer synthetic organic insecticides which control not only the boll weevil but also other insects now recognized as being highly destructive, were used in 1950 and 1951 together with calcium arsenate on probably about 35 to 40 percent of the cotton acreage over the entire boll weevil area. In South Carolina, 81 percent of the acreage was treated in 1950, and about the same proportion in Mississippi.

From 80 to 95 percent of the domestic usage of aldrin, dieldrin, heptachlor, and toxaphene probably has been on the cotton crop. Consumption of calcium arsenate and benzene hexachloride is somewhat less dependent upon infestations on cotton, yet from 65 to 85 percent of these materials probably also have been applied here. DDT has a much broader use base, being used on many crops and in other types of locations. It is estimated that only 20 to 30 percent of the DDT which is used in the United States is consumed in the formulation of cotton insecticides. DDT will not control the boll weevil and several other important pests of cotton but it is included in many insecticidal mixtures for the control of such insects as the bollworm, the pink bollworm and various plant bugs and stink bugs. It is used extensively, therefore, on cotton grown west of the boll weevil area.

Factors of Demand and Usage

ESTIMATION of future requirements for cotton insecticides is complicated and difficult. This is due to the impossibility of predicting accurately the abundance of the various kinds of insect pests and the date and location of infestations. It is necessary to apply control measures rather regularly against some insects. For these, knowledge of the area concerned and the average rate of application would permit the requirement for particular chemicals to be calculated with fair precision.

Many of the most destructive insect pests, however, do not appear in damaging numbers every year. One of these is the boll weevil which in some years is not seriously injurious to cotton. In such years insecticides for its control may not be in great demand in considerable areas of the cotton belt.

Probably the most important factor affecting the extent and de-

TABLE 8.

Cotton Insecticide Consumption in the Boll Weevil Area, by States, 1950-52.[1] (In millions of pounds of dust equivalent)

State	1950	1951	1952	Percentage of consumption for 3-year period
				Percent
Alabama	61	28	14	6.9
Arkansas	58	49	37	9.6
Georgia	40	30	29	6.6
Louisiana	25	45	25	6.3
Mississippi	101	116	71	19.2
North Carolina	9	16	19	2.9
Oklahoma	13	20	6	2.6
South Carolina	33	52	31	7.7
Tennessee	9	14	—	2.3
Texas	153	252	133	35.9
Total	502	622	365	100.0

1 Derived largely from State reports; only 10 of the more important boll weevil States are included.

TABLE 9.

Percentage Distribution of Calcium Arsenate to Cotton States, average 1940-42, annual 1943.[1]

State	Three-year average, 1940-42	1943
	Percent	Percent
Alabama	4.30	6.98
Arkansas	12.43	8.71
Florida	1.16	.43
Georgia	15.90	16.55
Louisiana	6.59	6.72
Mississippi	14.11	11.38
Missouri	.69	1.08
New Mexico	.80	.89
North Carolina	2.46	1.03
Oklahoma	.88	1.54
South Carolina	2.74	1.52
Tennessee	2.18	4.60
Texas	35.76	38.58

1 Calculated from data furnished by the National Agricultural Chemicals Association; percentages based upon distribution to 13 cotton-growing states as 100 percent. These states received 78.44 percent of the total sold in the 1940-42 period.

TABLE 10.

Comparison of the total cotton acreage and the consumption of cotton insecticides in terms of field strength dust, 1950-52.

Year	Cotton acreage under cultivation July 1st	Cotton insecticides consumed in terms of pounds of field strength dust
1950	15,845,000	502,000,000
1951	25,860,000	622,000,000
1952	24,521,000[1]	366,000,000

1 Preliminary.

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gree of insect infestations, particularly of the boll weevil, is the severity of the winter and the character of the weather during the growing season. It can be seen from a comparison of cotton poisons (Table 10) that changes in total cotton acreage would be significant in estimating requirements only if they affect specific areas where the rate of consumption is reasonably uniform from year to year. The study of past trends in consumption and the consideration of expected changes in insect control practice are the most reliable means of determining requirements of insecticides.

The number of adult boll weevils that have survived hibernation in different sections of the cotton belt is a subject of much interest each spring to those concerned with cotton production. The number of days from September to March on which the temperature falls below 32°F. is correlated with the number of boll weevils found in cotton fields during May and June. It is these survivors that will, under favorable conditions, rapidly increase and become destructive in July and August.

Hot dry weather is unfavorable for the development of the boll weevil (Figure 1), whereas frequent rains provide good conditions for the growth of both cotton and the weevil. "Frequent rains" mean precipitation of 0.03 inch or more on eight to ten of the days between June 21 and August 19. In seasons and localities in the cotton belt having such rainfall, it is likely that boll weevil injury will be heavy in fields untreated with insecticides.

Many cotton farmers do not apply poison to the crop until insect damage becomes evident and adequate stocks of insecticides are generally not carried by the grower or his local dealer. A sudden and heavy demand may reach chemical manufacturers who are quite unprepared, and a shortage of insecticides may develop which cannot be overcome before the end of the season. For one or two years after a season such as 1950, when boll weevil injury was severe, cotton poisons remain in much demand.

Chemical manufacturers and insecticide formulators are encouraged to maintain a high level of production. The history of calcium arsenate production (Figure 2) demonstrates that more cotton poison may be sold the year following than during a peak year of boll weevil activity. When demand suddenly disappears, the producers find themselves with capital tied up in considerable inventories involving serious storage problems.

If sufficient cotton poisons to meet at least minimum needs were stocked locally by dealers and growers or placed on order well ahead of the growing season, this practice would tend to avoid serious shortages of poison and help to assure the production of a good crop despite the sudden appearance of heavy populations of the boll weevil. Manufacturers of insecticides would be better able to schedule their production and serve the grower by providing for his requirements of these essential materials.

It does not appear likely, however, that local storage of significant quantities of cotton insecticides will become general in the near future. As a result, manufacturers and formulators are forced to add to their costs a charge for storage of much of the carryover of insecticides from one season to the next.★★

LEGISLATION

(*Continued from Page 49*)

terial must be proven safe, which is technically impossible, and "Let the buyer beware," there should be a common philosophy which will protect the public and encourage the use of these vital tools in agricultural production. The present situation has already reached a point where the cost of research in relation to potential markets is out of all proportion. A recent study by the staff of *Fortune* magazine resulted in an article in their November issue entitled "Farming's Chemical Age." As part of this article, the "prenatal history of an insecticide" was outlined, as follows:

Synthesis and screening	$ 70,000
Patent expenses	8,000
Field tests (involving entomology and pathology)	495,000
Pilot plant	50,000
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Assuming that we now have satisfactory materials, the costs of advertising, promoting and selling must be added. Theoretically, under the system of free enterprise and freedom of research, the results of this work would be made available to the public, but, in the case of agricultural chemicals, each step is subject to legislative limitations or regulations.

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to produce and market a pesticide, when its use could be dependent entirely upon legislation and administrative procedures?

Miller Bill—Practical Answer

A step towards an approach to the problem is reflected in the current philosophy and proposed legislation of the Miller Pesticide Residue Bill, H. R. 4277, to amend the Food, Drug and Cosmetic Act. This bill is the result of meetings of Government agencies, farm groups, research personnel, land grant colleges, entomological groups and others. I can report at this time that many of these groups are now much in accord, with some slight amendments, and we hope that it will be passed at the next session of Congress. We believe that this Bill is basically a sound, practical piece of legislation under which all can operate, with the public still fully protected from any hazards. It would do much to clarify the present unsatisfactory situation.

Much progress has been made in obtaining mutual understanding and confidence between the Food and Drug Administration and the industry. Progress in this respect is continuing.

Frankly, we are sitting on the lid of Pandora's box which psuedo-scientists and false crusaders are trying to pry open to release all of the imaginary evils. With the real facts about pesticides we can nail that lid tight.

How best to reduce the resistance to the progress of pesticides has many aspects. Certainly one of the primary problems we have is the factual refutation of minority groups and some individuals who are destroying confidence in how these products are used. Such irresponsible statements serve to enhance the necessity for scientists to defend their research findings with real facts in every instance. A practical example of this is the recent article "Spray Residue Facts" by Dr. P. J. Chapman, New York State Agricultural Experiment Station, published and distributed in the *New York State Horticultural Society News*. (See page 37 of this issue of *Agricultural Chemicals*. Ed. Note)

The support of sound legislation, such as the Miller Bill, with the kind of testimony presented before the Committee by members of the entomological profession, makes possible wide dissemination of the true facts. Your support of the principles of the Miller Bill added greatly to the acceptance of this legislation and was a step in the right direction to protect your research activities and your contributions to American agriculture.

The true scientific facts which we all have must be presented to the public at every opportunity. The importance of pest control must be carried to your Congressmen and State legislators, the women's clubs, Rotary, Kiwanis, and similar organizations. We must not only talk to each other, which we are doing, but to those who do not have a direct interest in our work.

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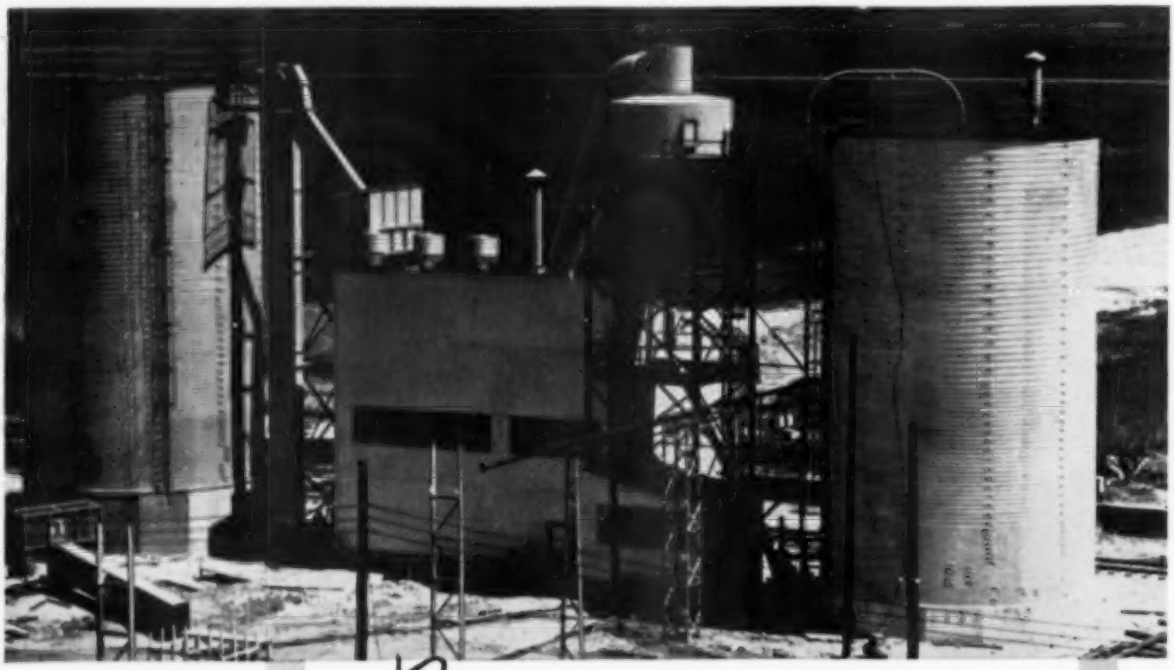

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Most of us at some time have seen the misuse of chemicals and the resultant adverse publicity which tears all of the good that has been accomplished and builds up the wall of resistance to a greater height. You share the responsibility with industry of making certain that all the recommendations for insecticide use are followed precisely according to the best available information. The record of entomologists in this respect is of the best, but consistently pounding away at the correct usage of these materials will serve to keep down adverse situations and diminish resistance to their use.★★

SPRAY RESIDUE FACTS

(*Continued from Page 37*)

used, these materials perform a useful function and are nonhazardous.

The fact that traces of spray residues may occur in some foods is much less important than whether the amounts present constitute a health hazard. No official spray residue tolerances for foods have been established. Some 20 odd years ago the Food and Drug Administration set up unofficial "tolerances" for arsenic, lead and fluorine. Recently, tentative unofficial "tolerances" have been suggested for DDT and others of our new organic insecticides. Does any health hazard exist where foods bear amounts of pesticides at or below these unofficial tolerances? All authentic toxicological and other scientific evidence agrees that hazards either do not exist or are negligible. The truth of this statement is fully borne out by experience.

Thus, no one has ever been killed or made definitely ill, to the writer's knowledge, by eating foods that may have borne traces of spray residues. *Claims* to the contrary have been made from time to time. But we are concerned here with fact rather than supposition and rumor.

DDT is a favorite target for alarmists on the ground that it has been suspected of being an accumulative poison. It has been charged with causing all kinds of dire illnesses. For the latest information on this question from an authoritative and thoroughly responsible source, the writer has gone to the U. S. Public Health Service. The *authorized* statement received by letter October 7, 1953, from Dr. G. W. Pearce follows:

"Originally it was thought that DDT was dangerous to use because it tended to accumulate in the body fat of humans and that it would eventually reach a dangerous level. Subsequent work indicated that a storage plateau was reached which would not be seriously high at the usual intake levels of our daily diet. More recently work at the Technical Development Laboratories of the U. S. Public Health Service has demonstrated that the DDT-like material stored in human fat consists largely of a degradation product of DDT called DDE which is practically nontoxic as compared to DDT. On the basis of the foregoing and more extensive experimental and general observations on the toxicology of DDT, Dr. D. J. Hayes, Jr., Chief of the Toxicology Section of the above lab-

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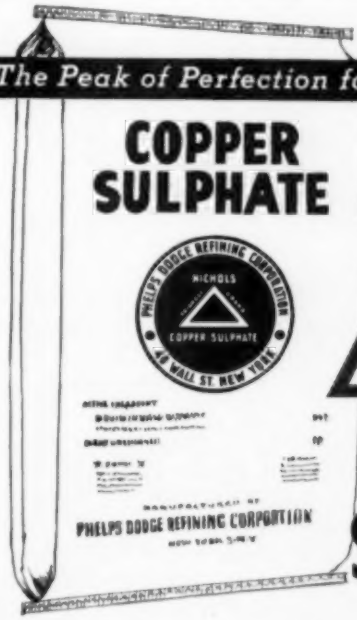

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Fertilizers with Triangle Brand Copper Sulphate added in their formulation will provide the necessary amount of this element vital to better crops.

Triangle Brand Copper Sulphate is available in Large and Small Crystals, Superfine (new snow form), and the 'Instant' (powder) forms which contain 25.2% metallic copper. Triangle Brand Basic Copper Sulphate is available in powder form (average particle size is 2 microns) and contains 53% metallic copper.

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oratories, has recently concluded that "the danger of chronic toxicity is negligible." Thus, the fear of DDT as a hazard in our food supply is greatly alleviated."

More than three years ago the Food and Drug Administration conducted a gigantic hearing which we were told was held to obtain necessary information for the establishment of tolerances. No official tolerances have been established to date.

It is high time we had more efficient and practicable means of regulating pesticide use in relation to foods than presently prevail. Such means appear to be in sight in the form of the Miller Bill. It is now under consideration by the Congress. This is the Pesticide Residue Amendment to the Federal Food, Drug and Cosmetic Act (H. R. 4277).

This bill embodies sound and workable principles. In addition to providing fully for the protection of our health, it recognizes that food producers also deserve sympathetic consideration. Congress recessed before action could be taken on this legislation. But doubtless it will be up for consideration when Congress reconvenes. The Miller Bill merits your support!

It is, of course, necessary that every reasonable safeguard be set up to guard the health of all of us. We believe these conditions are being fully met in the case of pesticides. In considering questions of this sort, it is always desirable to keep things in their proper perspective.

So, let's face it: we live in a dangerous world. Aspirin, for example, caused 70 accidental deaths in 1949, lye and similar chemicals 87, petroleum products 117, and barbiturates (sleeping tablets) 466. Should we outlaw the use of these materials? Alcoholism killed 2,433 persons in 1948. Take automobiles: they killed 37,300 people and caused 1,350,000 non-fatal accidents in 1951 alone! Finally, in America, over-eating is charged with probably being the greatest single cause of shortening our life span.

In our concern over the possible hazards of problems like spray residues, let us not as a nation be guilty—in the language of the proverb—of straining at gnats and swallowing camels.★★

ANTIBIOTICS

(*From Page 99*)

to remove blighted parts from the trees. The total number of blight cuts made in a given plot divided by the number of trees in the plot is used to indicate severity of the blight.

Owing to the long blossoming period, the critical period for the fire blight hazard in 1953 extended from March 20 to May 1. Full bloom stage was on March 27, but many straggling secondary blossoms opened afterward. During this period there were ten days of rain. Daily rains fell from March 26 (1.2 inch) to April 30. The copper plot received eight applications, while the streptomycin plot had only four and, owing to conditions beyond control, the timing of the latter was somewhat out of line with those in the copper plot on the most dangerous dates (Table 2). In spite of this handicap, up to May 1 the streptomycin plot was showing outstanding control of the disease.

Streptomycin gave good performance not only in blight control but also in causing no fruit russetting. This latter quality of the streptomycin makes it a desirable substitute for copper if subsequent tests under varied conditions show consistent results.

Since the streptomycin plot received only four applications of dust and was not adequately protected at certain critical times during March and April, some increases in blight were registered, as evidenced by the number of blight cuts made from May 1 to June 1, 1182 as against 7000 cuts for the check plot of 290 trees. Only 30 blight cuts were made on the copper plot up to June 1. However, this relationship is still very much in favor of streptomycin which gave 83.8 percent control of the blight up to June 1.

In summary, bentonite dust containing 240 p.p.m. of streptomycin base effected good control of pear blight when applied four times during March and April. A copper-dust-treated plot developed light to severe fruit russetting, whereas the streptomycin-treated trees produced russet-free fruit.

PLANT FUNGICIDES

(*From Page 38*)

achieved with concentrated mixtures especially two and three times normal concentration. If the rate is increased to 5x, 6x or 8x, the difficulties of getting proper deposits on the individual trees increase rapidly and we do not believe the average grower should attempt to use these higher rates.

Present-day labor costs make it imperative that sprays be applied rapidly, but the grower should be sure, whether he uses dilute or concentrated mixtures, that each tree is

TABLE 2

Results of copper and crude streptomycin treatments for control of pear fire blight applied as dusts March 23 to April 30, 1953. Scab sprays: March 5 and 16. Codling moth sprays: April 4 and 24. Experiments in California.

Treatment	Total Number trees	Dusting dates	Total	Per tree	Percentage in relation to check
Crude streptomycin 240 p.p.m.	302	March 23[c] March 31[b] April 9[c] April 20	2	.007	2.92
20-80 copper dust	300	March 27[d] April 1 April 21	2	.007	2.92
Check (untreated) average				2395	100
1	290	——	93	.320	
2	264	——	42	.159	

[a]50 percent bloom
[b]4 days past full bloom
[c]calyx stage
[d]full bloom

thoroughly covered. There has been a tendency in recent years to reduce the amount of fungicide used in 100 gallons and to increase the number of applications per season. Theoretically the same amount of material is applied per season but I am not entirely sure that this is the correct approach to the problem. We have noted time and again in our experimental work that multiple applications of weak or sub-lethal doses have given more instead of less disease even though the total quantity of material applied per season remained the same. The peach growers in the South experienced great difficulty in 1953 in controlling the peach scab fungus. In some cases it appeared that repeated applications of a weak mixture aggravated the scab problem.

Concentrated spray mixtures and rapid mechanical methods of applying sprays are now standard procedures and will continue to be used on an expanding scale. To use them it is essential the growers be sure that each tree receives an adequate dose of fungicide. Properly used these modern methods give satisfactory results.★★

COTTON CONFERENCE

(*From Page 59*)

of Louisiana in 1953 are believed to be due to faulty application of insecticide, according to K. L. Cockerham, Louisiana Extension Service, Baton Rouge. Heavy infestations of flea hoppers attacked cotton during 1953, and thrips also appeared late in the season.

L. C. Murphree, Coahoma Chemical Co., Clarksdale, Miss., reported that insecticides often get the blame for failing to kill insects, when actually improper application is responsible. In the same vein, A. C. Gunter, Hercules Powder Co., Wilmington, Del., pointed out that untimely and improper applications prove costly to the farmer and help defeat efforts spent on over-all pest control. It is too often the case, he added, that a bollworm poisoning schedule is started at a time it should be finished. Proper measurement, application and poison selection are to no avail if the timing is wrong. Still another factor, he continued is failure caused by low dosage . . . in one case, an insect control program failed because only 50 per cent of the minimum recommended dosage had been used.

L. M. Sparks, South Carolina Extension Service, Clemson, S. C., advocated the issuance of blanket recommendations for farmers, since the latter are generally inefficient in checking the requirements of their own fields. He also stressed the importance of timing and dosage in the application of insecticides.

Of considerable interest to members of the conference was a comment by P. H. Smith, cotton farmer of Slocomb, Ala., who said that it was a general practice on his farms to keep in stock adequate insecticide to meet the major needs of the season . . . that should the pesticide requirements in a particular season be small, the insecticides are simply stored for

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TVA DEVELOPMENTS

(*From Page 47*)

Analyses of both the fresh and cured product indicated that the material compared favorably with normally-produced superphosphate. Further studies might be required before such a cone mixer is ready for commercial use.

Ammoniation Processes

PERHAPS the most important contribution made by TVA in its experimental work lies in its development of new equipment for continuous ammoniation of mixed fertilizers. The ammoniation of superphosphates and of mixtures containing superphosphates has been the subject of thorough study by TVA. One objective of this work is to find methods for ammoniating to a higher degree than usual without serious reversion of P_2O_5, loss of ammonia or other undesirable effects. Another phase of the study was to devise improved equipment for carrying out the ammoniation.

Thus, the development of the continuous ammoniator offers some advantages over conventional batch ammoniation equipment. Results so far have shown promise for further advantages to be gained. Tests of the continuous ammoniator have not yet been completed.

The equipment consists of a rotating cylinder with retaining rings at each end; means for feeding superphosphate into the cylinder and for removal of the ammoniated product as well as for removing the water vapor formed by the heat. Anhydrous ammonia or ammoniating solution is introduced through a slotted tube.

Provision can be made for incorporating sulfuric acid under the bed of material in the ammoniator. The tube is almost as long as the cylinder and it is possible to distribute the ammoniating medium into various sections of the charge in predetermined proportions.

A number of advantages have been noted in the use of this process. Among those are listed the following:

1. Introduction of the ammoniating medium well beneath the rotating bed of solid materials makes possible the use of gaseous or liquid anhydrous ammonia or of ammoniating solutions with equal facility and permits attainment of a high degree of ammoniation without excessive loss of ammonia.
2. Since the ammoniation is continuous, there is no time lost in charging and discharging the ammoniator as is the case with a batch ammoniator.
3. Granulation of the charge during ammoniation appears to be feasible under certain conditions; thus, in some cases, the need for special equipment for granulating would be obviated.
4. Water vapor released during the ammoniation is swept out by a current of air, which eliminates condensation on the walls of the ammoniator and wetting of the incoming charge.
5. The use of a continuous process may reduce labor.

A recent demonstration of this ammoniator at TVA attracted some 300 visitors, most of whom represented the fertilizer manufacturing trade. Widespread interest in the continuous ammoniator has been reported, with a number of companies indicating plans to intall similar processes in their plants.

E.S A. MEETING

(*From Page 55*)

Phosphate Insecticides

THE economic value of the phosphate compounds has been well established, and it is generally recognized that marked increases in crop yields can be obtained by their judicious use, stated Dr. Kenneth P. DuBois of the University of Chicago. "In addition, the control and prevention of disease has been greatly reduced during recent years by the use of new insecticides. Thus, although certain toxicological problems . . . accompany the use of most of these insecticides, it seems worthy of emphasis that the beneficial effects of these materials greatly exceed their harmful properties."

Toxicological problems mu t be given consideration in order for the maximum economic value to be obtained from insecticidal agents . . . Dr. DuBois continued. "Realization of the possible hazardous nature of these chemical agents has stimulated applied and basic research on their toxic effects on mammals."

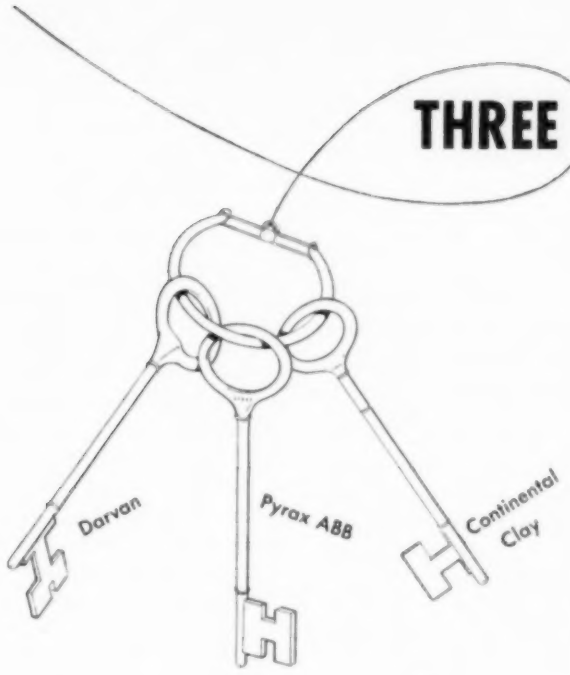
He stated "the proper use of atropine can antidote two to three lethal doses of the organic phosphates. Atropine will counteract four to six lethal doses of organic phosphates like OMPA which do not produce central nervous system effects." Adjuvants to atropine therapy such as oxygen and artificial respiration are sometimes necessary. However, in view of the limited effectiveness of atropine, prevention of poisoning, by the use of protective clothing, masks, periodic determination of cholinesterase and other precautionary measures are advisable in order to prevent the occurrence of accidental poisoning, Dr. DuBois concluded.

Parathion on Citrus

OBSERVATIONS of seventy-five spray hands engaged in different citrus spray operations during two seasons in Florida showed a steady decrease in cholinesterase level as a result of prolonged contact with parathion. This decrease was most rapid among concentrate spray operators and those who did not wear masks, reported Dr. C. R. Stearns of the Florida Citrus Experiment Station.

He recommended that men engaged in concentrate spray operations should be limited to not more than seven to ten days of continuous exposure for speed sprayer operators and three to four days for supply tank operators, if they are supplying more than one speed sprayer. Hand gun operators should not spray for more than five to seven days continuously," he said. "No man should handle more than 2,000 pounds of parathion without a period of freedom from exposure."

"Periodic blood checks will permit exposure periods to be prolonged," he said, and such tests should be made prior to exposure. If the cholinesterase level falls below 70% of normal, the worker should not be allowed to spray with parathion, but he may return to spraying when his cholinesterase has returned to the pre-exposure level," Dr. Stearns concluded.



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Continental Clay is recommended as a highly compatible and non-alkaline carrier for your agricultural high bulk dust. Continental is further recommended for wettable concentrates.

For both High Bulk Dusts and Wettable Concentrates, Continental Clay is an economical, top quality carrier of unusually fine particle size (0.8 micron by air permeation and less than 0.75% retention on a 200 mesh screen). Continental is a non-abrasive, extremely flowable carrier for high bulk dust. In wettable concentrates, it is outstanding in qualities of dispersibility and wettability. Continental Clay assures uniformity for all your dry dusts and wettable concentrates. Continental Clay is always available in adequate supply.

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"Tagged Systemics"

RADIOACTIVE Systox and OMPA were used by Dr. R. L. Metcalf and his associates at the Citrus Experiment Station, Riverside, in experiments on citrus, walnuts, deciduous fruits, cotton and potatoes. Treated crops were checked at intervals of two and four weeks following application of these materials. Residues found were extremely low, Dr. Metcalf stated.

Tests so far, indicate the systemics properly used are not lethal to bees and other beneficial insects which are helpful from the biological control phase. Only insects which feed by sucking plant juices appear to be affected by the systemics. Systemics also appear to be less effective during cool, damp weather conditions. Since these conditions favor the development of many insects and mites, there is needed for correcting this weakness if possible.

Although the systemics can be applied with standard equipment, new techniques for more efficient application are being developed, Dr. Metcalf said. These include the possibility of soaking seed in a systemic solution before being planted.

Insects and Plant Disease

GLOBAL movement of insect pests and associated diseases can be expected to increase, said Dr. Walter Carter of the Pineapple Research Institute, Honolulu. "Vast forests in the tropical areas are being revealed as reservoirs of hitherto unknown insects and diseases, only awaiting the growing of a suitable crop and the host transfer of insects to establish diseases in uninfected areas."

"Virus diseases carried by insects may offer the greatest threat to the food sources of the world, for some of the most devastating diseases of agricultural crops throughout the world are in this category. The problem is clearly an international one, requiring multilateral action and would appear to be a suitable function for the plant protection section of the United Nations, Food and Agriculture Organization," he concluded.

New Insecticides

THE lone new insecticide announced was Holcomb Compound 326, Diethyldithiocarbamic phosphorodithioic anhydrosulfide *O, O*-diisopropyl ester, an experimental miticide and aphicide developed by the J. I. Holcomb Manufacturing Co., Indianapolis.

ESA members and their friends took over the Biltmore Bowl for the annual banquet, which was notable for its complete lack of formal speeches. The floor show and dancing was enjoyed by all.

The centennial of Entomology which will occur next summer was announced at a business session, December 10th. This will commemorate professional Entomology. Information will be released on insect problems, contributions of the profession of Entomology to the public in various ways; and how these contributions have affected the economy of the country. It is expected that USDA and other publicity will be available in June, and there will also be radio and TV information, with possibly a commemorative stamp, stated Dave Hall, chairman of the Public Information Committee.

An excellent job was done by the Committee on Local Arrangements under the chairmanship of Roy Campell.

The 1954 meeting place was announced as the Rice Hotel, Houston, Texas; time of meeting will be December 6, 7, 8, and 9.★★

APHID SURVEY

(*From Page 97*)

the fall of 1952. Green peach aphid was found in most thickets examined in the fall of 1953, whereas this aphid was absent or in very low numbers in most thickets during recent years.

It would appear that a much larger than usual percentage of the aphid eggs now on wild plum were deposited by the green peach aphid. Aphid egg populations on swamp rose, the most important primary host of the potato aphid are about normal. Compared with the fall of 1952, they are slightly less abundant beside buds, but more than twice as abundant in limb and branch crotches. As in 1952, counts during the fall of 1953 showed that rather a large percentage of the aphid population on swamp rose consisted of the potato aphid.★★

New Ag. Book by DuPont

The story of modern agricultural technology is told in a new booklet published recently by E. I. DuPont de Nemours & Co., Inc., Wilmington, Del. Titled "This is DuPont . . . the Story of Agricultural Chemicals," the 32-page, well-illustrated booklet recounts the history of farming from earliest times and credits technology with being the most important factor in bringing about so many significant changes. Largely through this means, the book says, the American farmer during the past 75 years, has made greater progress than in recorded history's 7,000 years.

An artist's conception of insects, pictured as mechanical engines of destruction, illustrates how horn-flies, corn earworm, grasshoppers, codling moth, Mexican bean beetles and aphids devour various crops, causing losses of some $4 billion a year. The article also explains the pesticide to be used for control of these pests.

Somewhat the same treatment is given weeds, termed as "criminals," in the book. Illustrations of chemical weed control are presented with a written commentary on the history and working of herbicides.

The importance to plant growth of nitrogen is treated in another chapter in the duPont book. A drawing of a "farm factory" is presented, showing how a growing plant converts raw materials into a finished product through air, water and plant food.

Plant diseases, which cost the U. S. food supply some $3 billion in crops each year, and weeds, which cost the American farmer about $5 billion annually, are other prime targets of chemical research. Ways in which these traditional agricultural enemies are being conquered by modern science are shown in the Du Pont booklet.

WASHINGTON *Report*

by

Donald G. Lerch

Cornwell, Inc., Washington, D. C.
(Agricultural Chemicals Washington Correspondent)

THE National Agricultural Chemicals Association is raising what many consider one of the most challenging problems confronting the pesticide industry—how to build public confidence in the safety of insecticides. The problem is made acute by the periodic flurry of attacks launched against the industry, charging it is the cause of many serious human ailments.

Lea S. Hitchner, executive secretary of NAC, believes that the real facts about insecticides form the lock of "Pandora's box which psuedo-scientists and false crusaders are trying to pry open to release all of the imaginary evils."

Emphasizing the seriousness of the problem and its effect on legislation, Hitchner said irresponsible statements, "enhance the necessity for scientists to defend their research findings with real facts in every instance . . . no other country in the world enjoys as much variety, quality and safety in their foods as does America."

NAC's experience with this problem shows that while those who level broadside charges against the industry are few in number, their statements receive wide attention particularly in the daily press and some magazines which often tend to sensationalize their articles. Hence, a minority opinion sometimes appears to the casual observer as the accepted view.

The point NAC is making is that only facts can be used to refute alleged facts. That scientists themselves have a responsibility to their profession to make known their findings and refute irresponsible statements. This is a distasteful mission for many scientists who would rather concentrate on their work and who by the very nature of their profession respect a minority position.

Yet, NAC feels that when progress is impeded, it is time for action. Resistance to progress has many aspects, Hitchner feels, but "certainly one of the primary problems is the factual refutation of minority groups and some individuals who are destroying confidence in how these products (pesticides) are used."

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Direct answers to some of the questions raised about certain insecticides were given recently by E. L. Meister, manager, "The American Fruit Grower" over radio station WGY-Schenectady, New York. Meister reviewed the many laws regulating pesticides and the intensive testing conducted by industry before marketing a product.

The grower's responsibility for following directions and precautions on the label was another of his major points. "The farmer's best authority for the use of farm chemicals is close observance of directions for use which appear on the label or those of the spraying and dusting schedules issued by agricultural colleges and the U. S. Department of Agriculture," Meister said.

There is some feeling that radio farm and garden programs plus broadcasts directed to women can provide an important avenue for presenting helpful factual information to the public. WGY has an outstanding record of farm service broadcasting dating back to the earliest days of radio. Scores of other stations maintain farm and home economics departments, staffed with people recognized in their respective fields as qualified to report developments to their listeners accurately. It might be well worthwhile to develop closer working relationships with these people.

•

Industry officials are anxiously awaiting to see what's in the Miller Bill when it is reported out of Committee. Conferences are continuing among Committee members, government officials and industry representatives. Thus far the general provisions of the Bill have received industry support. However, it remains to be seen what provisions are actually in the Bill when reported.

In commenting on the Bill, W. W. Allen, vice president, National Agricultural Chemicals Association observed that "no piece of legislation is ever perfect, but this bill which treats pesticides separately from additives used in the processing of foods is the best piece of legislation of its type which has been submitted on the Federal level. We believe the Miller Bill in amended form will be reported favorably by the Committee and that when it is passed by the House, it will go to the Senate."

•

Full scale debate on the general farm program is scheduled to begin before both the Senate and House Agriculture Committees in February. Hearings are expected to run at least a month with attention centered on the level of price supports, acreage controls and export markets.

Secretary Benson is readying his testimony which will include recommendations made by industry and organizations as well as studies

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inside the Department. It is likely the hearings and resulting legislation will have a big effect on farm operations throughout the nation.

•

There's a note of reserved optimism among many fertilizer industry leaders in their appraisal of business this Spring. James F. Doetsch, president of the Chilean Nitrate Sales Corporation is hopeful that total fertilizer consumption will equal last year in spite of the drop this fall.

Other industry men are concerned over the shipping problem ahead this spring when it appears a tremendous volume will be moved during a few weeks. Farmers in some areas are being advised to buy early.

•

A second look at crop production figures shows that 1953 totals are virtually tied for the second highest record in history. Yet, the acreage planted is smaller than in eight of the past nine years according to USDA statistics.

It's the yield per acre which on an overall basis is the highest in history. Another paradox, however, there was no spectacular record set by any single crop. It's just that they were all very high. Harvesting conditions were ideal over most of the country. The drought did not affect early harvested grains such as wheat and in effect helped corn and soybean crops since there was little or no soft corn or high moisture soybeans.

Record fertilizer usage for these crops is looked upon as a most important factor.

•

A new study by the Entomological Society of America shows a booming demand for insect bulletins from farmers. Although all the data is not yet assembled, the findings are surprising some entomologists who are learning they are more popular than supposed.

For instance, the survey shows that during the growing season, over one-third of the requests coming to the average county agent's office concern insects. On an annual basis, the figure is 15 per cent. Yet few states require undergraduate courses in entomology as a pre-requisite to county agent work.

From a research viewpoint, far less than 15 per cent of state funds in most instances are allocated to entomological work. The same is true in the federal government.

Home gardeners are apparently much concerned about insects because county agents in counties with large urban populations report the highest number of queries about insect pests. When the full report is assembled, it may serve as a very useful guide in helping government agencies gear their operations to better serve the public.

•

Both industry and government scientists are keenly interested in the new tests on BHC to be conducted this year on the cotton insects—particularly aphids. Both low and high gamma content BHC will be used in the experiments.

Apparently the varying success resulting from BHC usage this year is causing scientists to want another "look-see." Reportedly one of the main goals is to learn more about the relationship of gamma content to total insect kill. Consequently, it's expected that all forms of commercially available BHC will be tested.

USDA entomologists, state experiment station and industry scientists are planning to cooperate in this work. As a result, it is hoped that mixers and formulators will have more facts to guide their selection of the particular gamma content BHC which will give effective control and meet competitive conditions.

•

More study is planned in the hope of developing a better "prescription" for aerial application of insecticides. More entomologists are recognizing that the ideal particle size for application by ground machines is often not suitable for airplane application.

With aerial application growing, it becomes more important to develop materials especially suited for this market. Articles, such as the recent one in the *Saturday Evening Post*, serve to dramatize a growing industry which may someday be a

major customer of the pesticide industry.

Research in this area may also help lick the problem of drift which has been quite hazardous, particularly with herbicides.

•

The organizational meeting to establish an American group under the American Standards Association to work with the International Standards Organization in setting coined names for pesticides is scheduled for mid-January in New York City. Officials of the USDA and other government agencies are cooperating. It's expected that progress will necessarily be slow.

Suppliers' BULLETINS

Extra Accuracy Claimed for New Scale

Richardson Scale Co. has developed a new automatic tare-weighing system which its makers say eliminates even the smallest overages and underages. Under this system, a drum, can, cylinder or box is automatically tared and then filled with product until a selected weight is reached. At that point, the weight in the container is then recorded or printed for permanent record.

Containers may be fed to the weighing platform either manually or by automatic indexing system. Richardson states that taring is accomplished by instruments, thus eliminating all possibility of human error.

Complete information on the new weighing device is available from the Richardson Scale Co., Clifton, N. J.

•

Dust Collector Described

A new mechanical dust collector has been announced by A. W. Banister Co., Inc., Cambridge, Mass. It operates by separating dust from air by centrifugal force.

The device is described as a cyclone of modern design, is easy to install and requires a minimum amount of space. The product, called "Dustmaster," is available in single, duplex, quadruplicate and two-stage arrangements. They can be operated either under suction or pressure.

A 12-page catalog, fully illustrated, is available from A. W. Banister Co., Inc., 23 Charles St., Cambridge 41, Mass.

•

"Versen-OL" New Chelate

"Versen-OL" is the name of the new product which should have wide application in wet processing wherever trace iron creates a problem and causes trouble through its contaminating influence. Known chemically as the trisodium salt of N-hydroxyethylethylene diamine triacetic acid, the new compound is extremely soluble in water and highly stable throughout the pH range.

Versen-OL, discovered and developed by Bersworth, is the newest of the "Versenes." It is manufactured by The Bersworth Chemical Company in Framingham, Mass. Patents on the new product are already pending and it is now available in commercial quantities.

•

Du Pont Fungicide Report

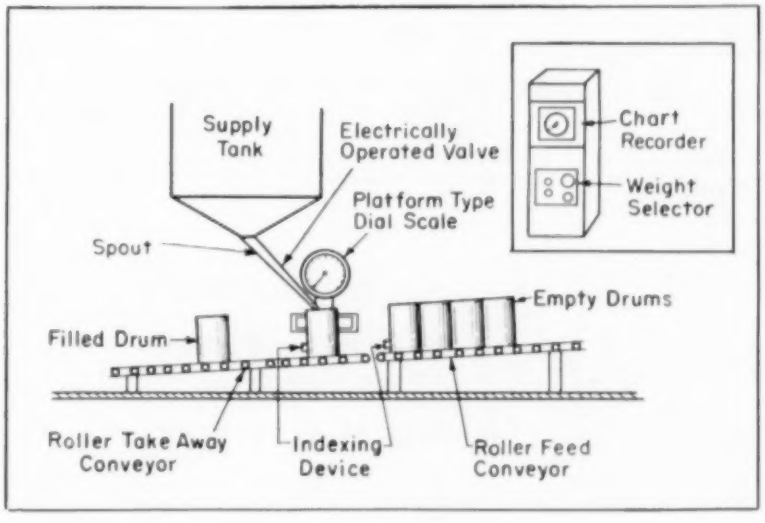
A 35-page report was issued recently by E. I. duPont de Nemours & Co., Wilmington, on another season of work with "Arasan" seed disinfectant as applied to grasses and legumes. Tests with the combination treatment on peas and vine crops, beans, corn, and sorghums; as well as "Ceresan" treatments on cotton are also discussed.

The report covers the fourth in series of tests of on-farm testing. Generally, the major part of the tests indicate a good stand by treating the seeds.

•

New Fertilizer Plant

Freeport Sulphur Co., announced recently its plans to open another sulphur mine in Nash, Texas. Production is scheduled to begin early in 1954.



More Books....

Insect Resistance in Crop Plants

by Dr. Reginald H. Painter

520 pages, price $9.80

Here is a complete analysis of the relationship between crops and phytophagous insects together with a full analysis of the insect resistant varieties of important crops, such as wheat, corn, cotton, sorghums, potato.

Soils and Fertilizers

by F. E. Bear

375 pages, price $4.50

This text presents the basic scientific facts and principles behind the production and utilization of agricultural chemicals. The why, when, where and how of fertilizers is expressly discussed, with particular emphasis on the importance of lime and fertilizer materials in maintaining and increasing the productivity of soils.

Weed Control

by W. W. Robbins, A. C. Crafts, and R. N. Raynor

543 pages, price $8.00

Here is an authoritative, thorough book that gives you all the data and practical help you need to prepare—and carry out — a tested, efficient, successful method of attack on any weed in any location quickly and effectively. Based on experience, research and experiment, it shows what methods of weed control have proved most effective for weeds of all species — from crab grass to wild mustard — points out what methods can be applied economically in certain areas — shows how and when to apply a control measure, the season and rate of application, dosage, etc., and outlines the materials and machinery needed.

Chemistry and Uses of Insecticides

by E. R. de Ong

445 pages, price $6.75

Written by an outstanding student of entomology and agricultural technology, this book covers all the major insecticidal agents in detail, describing not only their chemical nature and properties, but also their specific action on various types of insects, their methods of application, and their effect on animals and humans.

Soils and Soil Fertility

by L. M. Thompson

330 pages, price $5.00

This authoritative treatment begins by telling what soil is — what makes it up physically, chemically, biologically —and what its moisture-holding characteristics are. The use of commercial fertilizers and farm manure are other subjects under discussion.

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New Spreaders Offered

Highway Equipment Co., Inc., Cedar Rapids, Ia., has introduced its new 1954 model "New Leader" spreaders for applying fertilizer.

The makers state that the new spreaders have been redesigned from previous models to incorporate new features. These include a 24-inch-wide conveyor, allowing a lower center of gravity, steeper sides to prevent bridging and a greater payload.

High tensile abrasive-resistant steel construction has been incorporated for lighter weight and more strength, but the twin distributor discs have been retained to distribute the material evenly.

One model, a combination fertilizer and limestone spreader, features complete spreading service in a single unit so various amounts may be applied with great accuracy (from 100 pounds per acre to any maximum desired) at speeds from 1 to 35 mph.

Bodies on the spreaders have been redesigned for better weight distribution on modern trucks and the addition of the fertilizer attachment hood on the combination spreader, as well as the means of attaching to the body are completely new.

Other features, according to Highway Equipment Co., include new gear boxes; boxed-in top edge and internal gussets; aluminum gear case to resist corrosion; V-belt drive and fewer working parts.

Descriptive literature on the "New Leader" line of spreaders is available from the company, 616 "D" Ave., Northwest, Cedar Rapids, Iowa.

•

Eston Announces "Estonox"

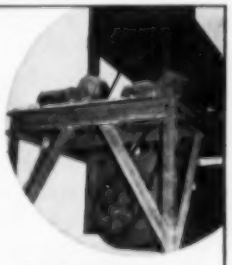
Development of a new toxaphene spray insecticide which leaves a residual deposit was announced recently by Eston Chemicals Division of American Potash & Chemical Corporation, Los Angeles.

The toxaphene formulation, called "Estonox," is reported to give good control over such pests as boll worm, lygus, cotton leaf worm, thrips, army worm, cotton aphid, boll weevil, grasshoppers, spittle bug, salt marsh caterpillar, sugar beet webworms, pear psylla, serpentine leaf miner (found in beans, potatoes and tomatoes), and such livestock pests as ticks, lice, and horn-fly.

Estonox sprays are said to be more economical under most conditions, than dusts, from standpoint of both labor and material; they are generally much less apt to "drift" than are dusts, and thus lessen the danger of contamination of adjacent crops.

The compound is available in two formulations—Estonox-4OW and Estonox-6OE—which provide effective control of insect pests under a wide range of conditions.

Let Young Machinery solve your Insecticide Processing problems!



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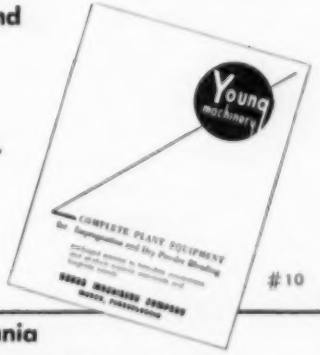

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Complete Plant Equipment for Dry Powder Blends, Concentrates and Emulsions

Young's New Blending System

The Young Machinery Co., Muncy, Pa., announced recently the new 500 pound portable dry powder mixing and blending system, which has a productive capacity of 3-4000 pounds per hour of finished blended insecticide dusts, which meet spatula tests.

The 500 pound system is said to require less operating man power, less maintenance and lower power consumption. It features a dust hood at loading station, brush sifter, pre-mixer, closed circuit pneumatic conveyor-blender, and after-mixer with dust hood and bagging station.

•

S. A. Purchasing Office

Industrias Quimico-Agricolas, S.A., Managua, Nicaragua, C.A., announced recently that effective with December, 1953, its purchasing office in the United States would handle all purchases of agricultural chemicals used in its insecticide and fertilizer plant in Nicaragua, as well as purchases of materials for its friends and customers in Central and South America.

•

Philippine Govt. Buys Pival

The Philippine Government recently purchased 46,200 pounds of Pival Concentrate for use in connection with an extensive rodent control program which has recently been undertaken in the Philippines. Pival Concentrate, a product of Motomco, Inc., New York, is one of the new anti-coagulant rodenticides.

Our Apologies

In one of those cases of mistaken identity, which occasionally creep into the pages of *Agricultural Chemicals*, we wrongly identified D. F. Murphy, vice-president of Rohm & Haas Company and a member of the board of directors of the N.A.C.A., in running his picture in the October issue of *Agricultural Chemicals*. He was mistakenly identified as Frank Maughan, also of Rohm & Haas. Our apologies go to both gentlemen.

•

New Utah Fertilizer Plant

Plant construction of the new Carfield, Utah plant of Western Phosphates, Inc., is now about 95 per cent complete, according to Wilson & Geo. Meyer & Co., Intermountain, San Francisco, distributors for the company. Annual output of the new plant will be about 92,000 tons of treble superphosphate, ammonium phosphate and liquid phosphate.

FRY BAG SEALER

Makes Sift-Proof Seals in Heavy Weight Paper Bags

Fry Model CSG automatically makes a double folded sift-proof heat seal in the top of any heavy weight paper bag. The first fold is securely heat sealed; the second is glued for extra safety.

Bags handled include polyethylene and pliofilm lined, polyethylene coated and those with thermoplastic top sealing bands. Simple adjustments for bags of various heights. This model also handles bags which are not heatsealable by gluing the folds.

Machine above is perfect for granular or fine products such as insecticides, chemicals, powdered paints, fertilizers, dog foods, etc.

Other models available . . . when writing, please submit a sample of your bag and your product.

GEORGE H. FRY COMPANY 42 East 2nd St. Mineola, L. I., N. Y. GArden City 7-6230

EDITORIAL

(*From Page 31*)

of people who depend on pesticides, without ever realizing it, to give them a dependable supply of edible and insect-free food.

The Chapman article should be required reading for every legislator who may be faced over the coming year with the necessity of acting on this residue problem. It should be given the widest possible publicity by all factors connected with pesticide manufacture and use.

FUNGICIDE TESTS

(*From Page 73*)

rich VL-600 were used as wetter and sticker. Malathon 25% wettable for thrips in the sprays, Parathion 2% in dust applications. Materials considered not worth further trial include Orthocide 406 dust, Orthocide 50 wettable, Yellow Cuprocide, Fermate, and Zineb dust.

	lb.-100 gal.	DC	Y	OP
Control	—	6	5	5
Dithane D-14 + $ZnSO_4$ Spray	2-1	3	3	3
Dithane Z-78 Spray	2	4	4	4
Fermate Spray	2	—	6-7	6-7
Geigy 65% Zineb Dust	35 lbs./A	2	6	6
Manzate Spray	2	3	1	1
Orthocide 50 W Spray	2	1	8	8
Orthocide 406 5% Dust	50 lbs./A	—	9	9
Yellow Cuprocide Spray	2	8	7	7
Zerlate Spray	2	7	2	2

Spinach (Viroflay)

Downy mildew (*Peronospora effusa*). Riverside, California. J. T. Middleton, J. B. Kendrick, Jr., and T. B. Williamson. Seven weekly applications of the following fungicides were applied as sprays or dusts to field plots, at 70 gallons and 40 lbs. per acre respectively, beginning after mildew appeared. Dusts not worth further trials include Iscothan, Copper-Sulfur, and Stauffer N-521. First choice was Orthocide.

		DC	PS	Y
Captan (Orthocide)	Spray—1 lb.	1	1	1
Captan (Orthocide)	Dust—10%	1	1	1
Crag 5400	Dust—10%	2	1	1
Zineb (Parzate)	Spray—1 lb.	2	1	1
" "	Dust—10%	2	1	1
Stauffer N-521	Dust—2.5%	2	5	5
Crag 5379	Spray—1 lb.	3	1	1
" "	Dust—10%	3	1	1
Phygon	Spray—1 lb.	4	5	5
"	Dust—4%	5	5	5
Iscothan	Dust—0.43%	5	1	1
Copper-Sulfur	Dust (8% cu. + 15% sul.)	5	1	1
No treatment		5	1	1

Spinach (Viroflay)

Downy mildew (*Peronospora effusa*). Riverside, California. Middleton, Kendrick, and Williamson. In another test, 7 weekly applications were made with high pressure sprayer and power duster, results of which indicate that sprays were better than dusts.

What's new in Naugatuck *

MH-40* cuts mowing costs of cemeteries, parks, highways

After 4 years of thorough testing, Naugatuck Chemical has now made its remarkably versatile chemical, MH-40, commercially available nationwide as a grass inhibitor.

MH-40, already highly regarded as a herbicide and storage growth inhibitor, promises tremendous savings in labor and equipment cost of mowing for cemeteries, parks, highways and golf roughs.

In test results, one cemetery reports an estimated saving of more than 50% in edging costs... another a saving of $12 per 100 monuments. A highway MH-40 experiment revealed an approximate saving of $70 per acre per season. And new reports come in every day telling of MH-40 successes.

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* One in a series of advertisements demonstrating Naugatuck's continuing effort to introduce new and better products for agricultural and related uses.

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producers of seed protectants, fungicides, miticides, insecticides, growth retardants, herbicides: Spergon, Phygon, Aramite, Synklor, MH, Alanap.

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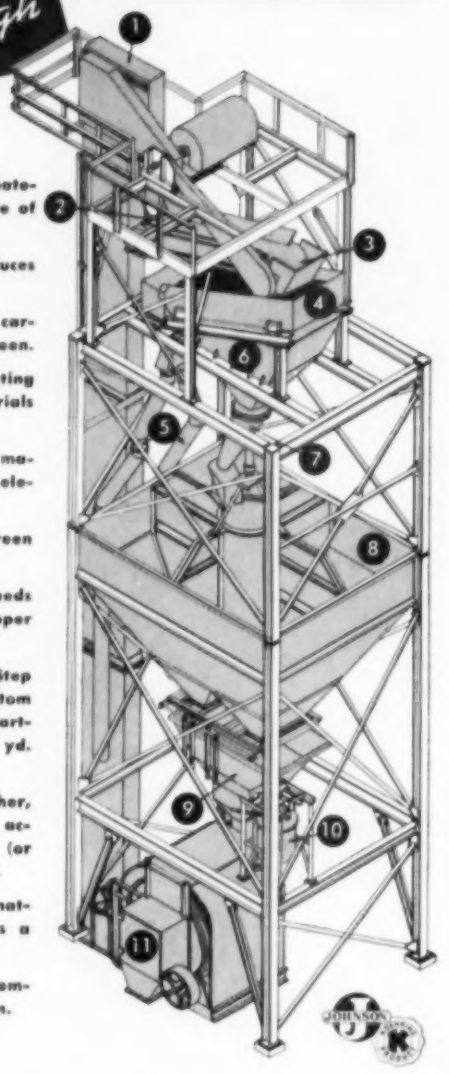

1. **Chain bucket elevator feeds material into the plant at the rate of 1000 cu. ft. per hour.**
2. **High-speed clod breaker reduces materials to required size.**
3. **Self-cleaning belt conveyor carries pulverized material to screen.**
4. **Vibrating, 4x10-foot separating screen controls size of materials fed into collecting hopper.**
5. **Reject pipes return oversize material from screen to bucket elevator for re-sizing.**
6. **Collecting hopper under screen charges pivoted distributor.**
7. **Full-revolving distributor feeds screened material from hopper into sectional storage bin.**
8. **Johnson 65 cu. yd. Stop-by-Step Bin, with fast-flowing 60° bottom slopes, has four 15-yd. compartments arranged around a 5 cu. yd. central tank.**
9. **Multiple-material weigh batcher, with 5,000-lb. dial-head scale, accurately weighs up to five (or more) fine-grained materials.**
10. **For adding liquids, semi-automatic solution weigh-batcher has a capacity of 500 lbs.**
11. **Mixing unit (2-ton capacity) completes final blending operation.**

Eliminating slow, costly manual methods, Johnson fertilizer plants elevate, pulverize, screen, batch, and blend materials in one continuous cycle of operation. Owners report substantial increases in production and savings in manpower. Installation shown here is one of two Johnson plants developed to meet the special needs of a large midwestern fertilizer manufacturer. It is typical of the many sizes and types of Johnson plants available for mixing and blending all types of materials . . . manually-operated or fully automatic. You can get many profitable ideas on plants and accessories from Johnson distributor . . . or write us.

J349

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		DC	PS
"Fench" (Fe D14)	6.90 lbs.-100	1	1
MEBD	1-100	2	1
Nabam	0.38 qts.-100	2	1
Captan (Orthocide)	1-100	4	1
Phygon	Spray 1-100	4	
"	Dust—8%	4	4
Zineb (Parzate)	Spray 1-100	2	
"	Dust—10%	4	1
Crag 658	1.5-100	3	1
Copper-Sulfur	4.5%-47.5% dust	4	1
Copper-lime	10 — 90 "	5	1
Spergon-Sulfur	5 — 65 "	5	1
No treatment		5	1

Sweet Corn (Ioana)

Northern Leaf Blight (*Helminthosporium turcicum*) Homestead, Florida. Robert A. Conover. In non-replicated field plots sprayed every 5 days with high pressure sprayer, the following fungicides were tested. Leaf blight was severe on the checks. Captan, Ethyl B622, C & C 5400, and Manzate were not considered worth further testing. Fungicides being recommended currently are nabam + zinc sulfate, and Zineb. The performance of LO 738 was judged equal to these two. Materials are listed in order of yield.

	lbs.-100 g.	DC	PS	Y
Manzate	1.5	2	3	1
Captan	2	2	2	1
LO 738 (R & H)	2	1	1	1
5400 (C & C)	2	4	1	2
B-622 (Ethyl)	3	2	4	3
Check	—	5	—	4

Tomato (N. N. Victor)

Early blight (*Alternaria*). Durham, New Hampshire. A. E. Rich, J. D. Bilbruck, and H. V. Toko. Ten applications at weekly intervals were made with knap sack sprayer to small plots. Rating of fungicides is given in order of over-all preference.

	lbs.-100 gal.	DC	OP
Captan	2	1	1
Manzate	2	1	2
Vancide 51 ZW	2	1	2
Dithane	2 qt.-¾ lb.	1	2
Phygon	¼	1	2
HB 160	2	2	3
Ethyl B 622	2	2	3
COCS	3	3	4
Bordeaux	8-4-100	4	5

Tomato

Early blight (*Alternaria and stemphyllium leaf spots.*) Salisbury, Maryland. C. E. Cox and J. G. Kantzes. Randomized field plots were sprayed 8 times between June 24 and September 8 with power sprayer at 150 gallons per acre. Materials are listed in order of preference.

	lbs.-100 g.	DC	Y	OP
Zineb	2	1	1	1
Z-Z-T-T-T-T-T-T*	2-2-4-4-4-4-4-4	2	1	1
Manzate	2	1	1	1
Z-Z-D-D-D-D-D-D*	2-2-2-2-2-2-2-2	1	1	1
Comb. of Z+T+ Skim Milk	1-2-½	2	1	1
Comb. of Manzate+ Copper "A"	¾-2	2	1	2
Z-Z-R-R-R-R-R-R*	2-2-1½-1½-1½-1½-1½-1½	2	2	2
Unsprayed Check		3	3	3
Captan	2	3	2	3

* Z = Ziram (Zerlate) ; T = Fixed Copper ; D = Zineb (Dithane Z-78) ; R = Robertson Copper.

Tomato

Late blight (*Phytophthora infestans*). Homestead, Florida. Robert A. Conover. In replicated field plots the following spray materials applied at 5-7 day intervals, with power sprayer, were compared. Late blight only moderately severe. Materials are listed in order of preference.

	lbs.-100 g.	DC	PS	Y	OP
Zineb (65%)	1.5	1	1	1	1
Zineb (65%)	2.0	1	1	1	1
Dithane D 14 + Techmangan	2 qt.-1 lb.	1	1	1	1
Parsate Liquid + Techmangan	2 qt.-1 lb.	1	1	1	1
Manzate	1.5 lb.	1	1	1	1
Nabam-$ZnSO_4$,—B 1956	2-¾-4 oz.	1	2	1	2
Nabam alternated with D14-Techmangan		1	2	1	2
Nabam-$ZnSO_4$	2 qt.-¾ lb.	1	3	2	3

Tomato

Late blight. Homestead, Florida. Robert A. Conover. The following new materials were compared on a 5-7 day schedule with commercial power sprayer on unreplicated field plots. Late blight moderately severe. The following materials were considered not worth further trial: B-622; 5400; LO 765; 48-CS-36; 48-CS-73; Cunilate; Cunimene; Veo-Vita; BFG 3,5-D; Tribasic Copper Sulfate; and Captan. "Of experimental materials only LO 738 is worth testing further."

	lbs.-100 g.	DC	PS	Y	OP
B-622	3	2	4	3	
5400	2	2	1	2	
Zineb (65%)	2	1	1	1	1
LO 765	4	2	3	3	
LO 765	6	2	3	4	
48-CS-36	1½-2	3	2	2	
48-CS-73	1½-2	4	4	5	
LO 738	2	1	1	1	1
Nabam-$ZnSO_4$	2 qt.-¾	1	2	1	2
Cunilate	3	3	1	3	
Cunilate-Cunimene	1½- 1½	4	1	5	
Manzate	1.5	1	1	1	1
Nabam-Techmangan	2 qt.-1	1	1	1	1
Neo-Vita	1 gal.	5	1	5	
BFG 3,5-D	2	4	2	5	
Tribasic Copper Sulfate	4	3	1	4	
Captan (75%)	2.75	2	1	2	
Check	———	5	1	5	

Record Phosphate Rock Output

Production of phosphate rock in the United States in the first half of 1953 as reported by the U.S. Bureau of Mines, Department of the Interior, broke all previous records with a 14 per cent increase over figures for the same period in 1952. Production in the first six months of 1953 totaled 6,563,805 long tons of phosphate rock with a P_2O_5 content of 2,109,907 long tons.

•

Monsanto Appoints

Michael H. Sloman has been named director of promotion for Monsanto Chemical Company's Merchandising Division. The appointment was announced by Roy L. Brandenburger, general manager of the Merchandising Division, who indicated that Mr. Sloman would be responsible for broadened advertising and sales promotion activities for the full range of products of Monsanto's Merchandising Division. R. Allan Gardner was named sales manager for the division's agricultural products as well as surface coatings.

•

Hudson Expands N.Y. Office

The Hudson Pulp & Paper Corp., New York, will move its New York sales and executive offices to larger quarters at 477 Madison Ave., New York City, in the spring of 1954. The announcement by Sam Lopin indicated the new building will allow Hudson 25,000 square of office space.

•

Fertilizer Essay Contest

"More Profits From Greater Fertilizer Use" is the subject of the 1953-54 Fertilizer Essay Contest, sponsored by the Soil Improvement Committee of the California Fertilizer Association. Only vocational agricultural students of Junior Colleges are eligible. Announcements have been directed to the vo-ag instructors of twenty California Junior Colleges, urging full participation of the students in their soils and crops classes.

Essays are not to exceed 2500 words, and are to be in the office of the Association in San Marino not later than April 30, 1954. Awards will be made before the end of the school year.

•

Gypsy Moth Damage High

Gypsy moth caterpillars ate the leaves off 1,500,000 acres of trees in New England in 1953, setting a new record for defoliation. This was more than double the defoliation in the previous record outbreaks of 1945 and 1937, when about 600,000 acres of trees were damaged.

•

F. W. Berk Names Sutcliffe

F. W. Berk & Co., Inc., Woodbridge, New Jersey, manufacturers of carbamate fungicides and related specialties, have announced the appointment of Norman Sutcliffe as manager of their West Coast office in San Francisco.

Mr. Sutcliffe will also be representing Berkshire Chemicals, Inc., 420 Lexington Ave., New York 17, N. Y., exclusively in the states of Washington, Oregon, California, Idaho, Utah, Nevada and Arizona, for the sale of their products. These include nitrate of potash, insecticides and fungicides.

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INDUSTRY *Patents*

The information below is furnished by patent law offices of

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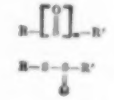
The data listed below is only a brief review of recently issued pertinent patents obtained by various U. S. Patent office registered attorneys for manufacturers and/or inventors. Complete copies may be obtained direct from Lancaster, Allwine & Rommell by sending 50c for each copy desired. $1.00 for Canada. They will be pleased to give you free preliminary patent advice.

2,654,667. SULFOXIDES AS PLANT DEFOLIANTS. Patent issued October 6, to Lyle D. Goodhue, Bartlesville, Okla., and Caroyln E. Tissol, Minneapolis, Minn., assignors to Phillips Petroleum Co. A method for defoliating a plant which comprises applying to said plant in a concentration and amount effective to cause its defoliation a compound from the group of compounds which can be represented by the general formulae

and



wherein R and R' are selected from the group consisting of the non-halogen containing radicals alkyl, cycloalkyl, aryl, alkaryl and aralkyl groups containing not more than 12 carbon atoms and m is an integer from the group of 1 and 2.

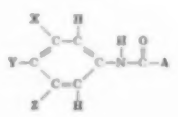
2,654,668. COMPOSITION FOR STIMULATING THE GROWTH OF PLANTS. Patent issued October 6, to Dominique Weibel, Nidau-Bienne, Switzerland, assignor to Chim A. G., Basel, Switzerland. A plant growth-stimulating composition which substantially consists of at least one plant hormone in admixture with a yeast autolysate, and antiseptic capable of preventing propagation of detrimental microorganisms in the composition, and a reducing sugar.

2,654,689. N,N'-PHTHALYL HYDRAZINE FUNGICIDAL COMPOSITION. Patent issued October 6, to Waldo B. Ligett, Pontiac, Rex D. Closson, Detroit and Calvin N. Wolf, Ferndale, Mich., assignors to Ethyl Corporation, New York.

A fungicidal composition consisting essentially of a material selected from the group consisting of N,N'-phthalylhydrazine, metallic salts thereof and salts thereof with organic nitrogen bases in amount less than about 50 per cent by weight, an inert diluent and a surface-active agent.

2,654,790. MANUFACTURE OF DDT. Patent issued Oct. 6, to Leo P. Curtin, Cranbury, N. J. In the manufacturing of DDT, the process which comprises condensing chloral and chlorobenzene in the presence of fuming sulfuric acid and from about 5 to 60 percent by weight based on the chloral employed of a catalytic agent selected from a class consisting of aromatic polysulfonic acids, containing from 2 to 4 sulfonic acid groups, which are soluble in but substantially nonreactive with the components of the reaction mixtures, cooling and agitating the resulting mixture within the range of from about —10° to +25° C. while slowly adding oleum and separating the resulting DDT from the reaction mixture; said oleum containing sufficient free SO_3 to supply from about 0,5 to 1.3 moles of free SO_3 per mole of chloral to the reaction mixture in addition to any required to raise the sulfuric acid concentration to 100 percent; sufficient chlorobenzene being used to supply a total of from about 2.2 to 4 moles chlorobenzene per mole of chloral.

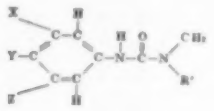
2,655,444. 3-(HALOPHENYL)-1,1-DIALKYL UREAS AND WEED CONTROL COMPOSITIONS AND METHODS. Patent issued Oct. 13, to Charles W. Todd, Wilmington, Del., assignor to E I duPont deNemours & Co., Wilmington, Del. A herbicidally-active trisubstituted urea compound represented by the formula



where A is a secondary amino radical selected from the group consisting of methylpropylamino, methylbutylamino and diethylamino radicals, X and Z are selected from the group consisting of hydrogen and halogen, and Y is selected from the

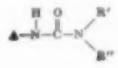
group consisting of hydrogen, halogen, alkyl, and alkoxy, the alkyl radical in said alkyl and alkoxy substituents containing up to four carbon atoms, and at least one and at most two of X, Y, and Z being halogen.

2,655,445. 3-(Halophenyl)-1-Methyl-1-(Methyl or Ethyl) Ureas And Herbicidal Compositions And Methods Employing Same. Patent issued Oct. 13, to Charles W. Todd, Wilmington, Del., assignor to E. I. duPont deNemours & Co., Wilmington. A herbicidally active trisubstituted urea compound represented by the formula



where R' is an alkyl radical up to two carbon atoms, X and Z are selected from the group consisting of hydrogen and halogen, and Y is selected from the group consisting of hydrogen, halogen, alkyl and alkoxy, the alkyl radical in said alkyl and alkoxy substituents containing up to four carbon atoms, at least one and at most two of X, Y, and Z being halogen.

2,655,446. Chemical Compositions And Methods. Patent issued October 13, to Charles W. Todd, Wilmington, Del., assignor to E. I. duPont deNemours & Co., Inc., Wilmington. A herbicidally active 3-(o-substituted phenyl)-1, 1-dialkylurea represented by the formula

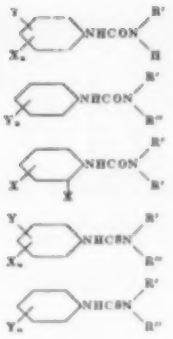


where R' is an alkyl radical having up to two carbon atoms and R" is an alkyl radical up to four carbon atoms when R' is methyl and up to two carbon atoms when R, is ethyl, and A is an ortho-substituted phenyl group selected from the the group consisting of

and

where X is halogen, n is a positive integer up to 2, and R is alkyl having up to four carbon atoms, the ortho-substituted phenyl group having one hydrogen on one of the nuclear carbons ortho to the group —NHCON(R')R".

2,655,447. Composition And Method. Patent issued October 13, to Charles W. Todd, Wilmington, Del. A herbicidal composition comprising a conditioning agent and, in amount sufficient to exert herbicidal action, a 1,3-substituted urea selected from the group consisting of compounds represented by the formulae:



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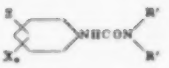

where R' is alkyl up to two carbon atoms; R" is selected from the group consisting of hydrogen and alkyl up to two carbon atoms; X is halogen; Y is selected from the group consisting of hydrogen, R and OR, where R is a monovalent aliphatic hydrocarbon radical of up to four carbon atoms having at most one unsaturation and that ethylenic; Z is selected from the

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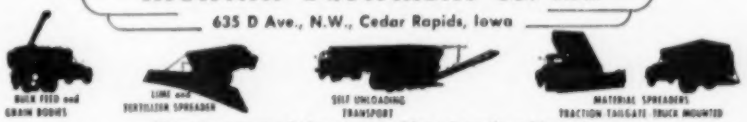
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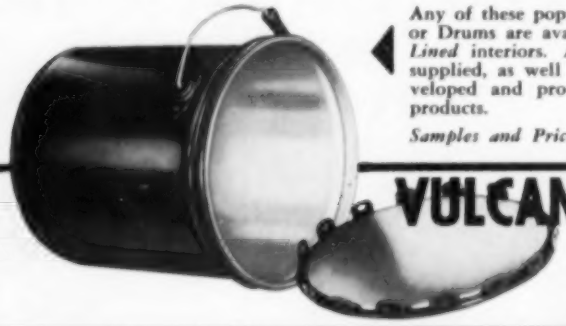

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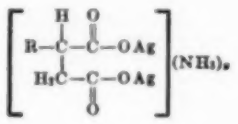
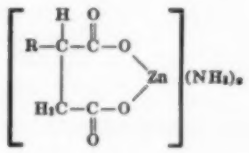
group consisting of alkenyl and alkenoxy radicals, the alkenyl radical in said alkenyl and alkenoxy substituents containing up to four carbon atoms; and n is a positive integer up to two, the aromatic substituent having hydrogen on at least one of the nuclear carbons ortho to the nuclear carbon to which the urea nitrogen atom is linked.

2,655,461. Complex Zinc-And Silver-Ammonia Salts of Alkenyl Succinic Acids. Methods for Preparing Them, and Methods for combatting Fungi Therewith. Patent issued October 13, to Mearl A. Kise, Portsmouth, Va., assignor to Allied Chemical & Dye Corp., New York.

As new compositions of matter, the complex metal-ammonia salts of alkenyl succinic acids selected from the group consisting of compounds having the following general formulas



and



wherein R represents an alkenyl group having from 4 to 24 carbon atoms inclusive, and x represents an integer not greater than 6.

2,655,513. Pesticidal Compounds. Patent issued October 13, to Morton Kleiman, Chicago, Ill., assignor to Arvey Corporation. As a new composition of matter a compound of the group consisting of 1,2,3,4,10,10-hexachloro - 1,4 - methano - 5,8 - oxa - 1,4, 4a, 5, 8, 8a-hexahydronaphthalene; 1,2,3, 4,10,10-hexachloro - 1,4 - methano - 5 - methyl - 5,8 - oxa - 1,4,4a,5,8,8a-hexahydronaphthalene; and 1,2,3,4,10,10-hexachloro - 1,4 - methano - 5,8 - dimethyl - 5,8 - oxa - 1,4,4a,8,8a-hexahydronaphthalene.

2,655,514. Pesticidal Compounds. Patent issued October 13, to Morton Kleiman, Chicago, assignor to Arvey Corporation. As a new composition of matter, a compound of the group consisting of 1,2,3,4,10,10-hexachloro - 1,4 - methano -5,8 - oxa - 6,7 - epoxy -1,4, 4a, 5,6,7,8,8a-octahydronapthalene; 1,2,3, 4,10,10 - hexachloro - 1,4 - methano - 5,8 - dimethyl - 5,8 - oxa - 6,7 - epoxy - 1,4, 4a,5,6,7,8,8a - octahydronaphthalene; and 1,2,3,4,10,10 - hexachloro - 1,4 - methano - 5 - methyl - 5,8 - oxa - 6,7 - epoxy - 1,4,4a,5,6,7,8,8a - octahydronaphthalene.

2,655,531. Method of Making Naphthaleneacetic Acid. Patent issued to Phillip L Southwick, Pittsburgh, Pa., assignor to Food Machinery & Chemical Corp., San Jose, Calif. A method of manufacturing 1 - naphthaleneacetic acid which comprises heating chloroacetic acid and naphthalene in open equipment under reflux and in the presence of sufficient potassium bromide so that a temperature in the range 210° C. to 235°C. may be reached in the reaction mixture, until 1 - naphthaleneacetic acid is formed.

2,656,072. Device for Mixing and Feeding Fertilizer. Patent issued October 20, to Howard G. Kronberg, Fargo, N. Dakota. In a device of the class described for mixing powdered material the combination of a casing, a tubular member rotatably mounted therein, means dividing said casing into compartments arranged longitudinally of said tubular member, means for supplying different powdered materials to the several compartments in said casing, said tubular member having an opening located in each compartment, means in each compartment for covering the opening in the tubular member therein, said last mentioned means having a passage communicating with said opening, means for directing powdered material through said passage and said opening into said tubular member when said tubular member is rotated, and means for rotating said tubular member.

2,256,073. Fertilizer Dispensing Mechanism. Patent issued October 20, to August G. Buhr, LaCrosse, Wis., assignor to Allis-Chalmers Mfg. Co., Milwaukee. In a traveling support having a power transmitting shaft disposed in transverse relation to the direction of travel and having a hopper attaching station disposed outwardly adjacent each end of said shaft, the combination of a material dispenser comprising a hopper structure and a feeder shaft rotatably mounted on said hopper structure in a position presenting an end portion of said feeder shaft in transversely and outwardly extending relation to a side wall portion of said hopper structure, fastening means operable to selectively secure said material dispenser to said support in an operative position at one or the other of said attaching stations, said fastening means comprising a pair of similar exterior projections on said hopper structure at opposite sides, respectively, of a plane extending radially from and in the longitudinal direction of said feeder shaft, pivot means cooperable with one or the other of said projections and mountable on one or the other of said attaching stations so as to hinge said material dispenser at either of said attaching stations for swinging movement outwardly from said support and into an inverted position about an axis generally parallel to the direction of travel, and releasable locking means cooperable with one or the other of said projections and with one or the other of said attaching stations so as to secure said material dispenser in each of said operative positions thereof against said outward swinging movement; and releasable coupling means cooperable with said end portion of said feeder shaft and with one or the other end portion of

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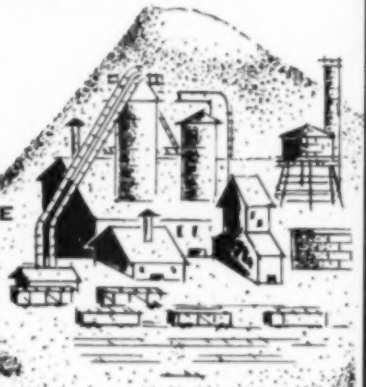

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said power transmitting shaft for selectively establishing and interrupting a driving connection between said power transmitting shaft and said feeder shaft.

2,656,247. AMMONIUM SULFATE AND CALCIUM OXIDE MANUFACTURE. Patent issued October 20, to Sam P. Robinson, Bartlesville, Okla., assignor to Phillips Petroleum Co. A process for the manufacture of ammonium sulfate in exceptionally high yield and calcium oxide with an available lime content above 70 weight per cent by the reaction of calcium sulfate with ammonium carbonate, which comprises passing a carbon dioxide- containing gas to a carbonation zone wherein said gas is cooled and contacted with ammonia in such a manner that said ammonia reacts with the carbon dioxide in said gas thereby forming ammonium carbonate, reacting calcium sulfate and thus prepared ammonium carbonate in an aqueous medium in a multi-stage reaction zone wherein each stage is of increasing size and decreasing agitation, introducing the ammonium carbonate to the first stage of said reaction zone in such quantity that it remains in excess throughout the reaction, separating the reaction product in such a manner that all of the solid material is removed from the aqueous ammonium sulfate liquor, storing thus-produced ammonium sulfate liquor only after all of the solids content has been removed, separating calcium carbonate recovered from said ammonium sulfate liquor from silica impurity by means of froth flotation, admixing with thus-treated calcium carbonate low ash carbonaceous material, burning said admixture at an elevated temperature and thereby calcining said calcium carbonate to calcium oxide and removing phosphate impurity, and recovering calcium oxide with an available lime content above 70 weight per cent as a product of the process.

2,656,248. AMMONIUM SULFATE PRODUCTION. Patent issued October 20, to Russell K. Simms, Bartlesville, Okla., assignor to Phillips Petroleum Co. A process for the manufacture of crystalline ammonium sulfate in a plurality of crystallization units wherein the free acid of the liquor is at variance from unit to unit and is to be maintained within an optimum range which process comprises arranging the several crystallization units for parallel operation so that when water, ammonia and sulfuric acid are introduced to said units the free acid content in each unit is approximately the same and within the range of 0.2 to 0.5 mol per cent excess based on ammonia, withdrawing and admixing the magma from crystal formation in the several crystallization units when the crystals have reached a size in the range of 20 to 60 mesh and passing the resulting admixture to a separation zone, separately recovering ammonium sulfate crystals and mother liquor in said separation zone, to assist in keeping the free acid content in each crystallizer within the range of 0.2 to 0.5 mol per cent adjusting said free acid content of recovered mother liquor to within said range, and recycling the thus treated mother liquor to the various evaporative crystallization units.

2,656,265. METHOD AND COMPOSITION FOR THE CONTROL OF UNDESIRED VEGETATION. Patent issued October 20, to Wendell R. Mullison, Midland, Michigan, assignor to Dow Chemical Co., Midland. A method for inhibiting the growth of germinant seeds and young seedlings which comprises the step of distributing in the growth medium a composition containing as an active toxic ingredient 2-(4-chloro-o-toloxy) ethanol.

2,656,396. PRODUCTION OF DDT. Patent issued October 20, to Cyril Hayward, Tarentum, Pa., assignor to Pennsylvania Salt Mfg. Co., Philadelphia. The method of producing a normally waxy DDT material in a hard, solid form, that involves discharging the DDT material in molten form into a heat transfer liquid in the form of fluid filaments of said material, the heat transfer liquid being maintained at a temperature below about 50° C., with moving contact of the DDT material relative to the heat transfer liquid to cool the DDT material quickly from above its setting point to below 60° C., the said heat transfer liquid having no deleterious effect on the DDT at the said temperatures, and thereafter, without turbulent agitation, collecting and coalescing the fluid filaments of cooled DDT.

2,656,648. MEANS FOR TRANSPORTING AND DISTRIBUTING FERTILIZERS ON FIELDS. Patent granted October 27, to Giovanni Friedmann, Milan, Italy. A transportable device for introducing animal fertilizer material into a piping which piping is provided with a couple of hydrants with a valve between said hydrants, such device including a tank, agitating means in said tank capable of well mixing stale manure with water, an injector the suction pipe of which communicates with the interior of said tank and tubes for connecting the feeding end and the delivery end of the injector with said hydrants.

2,657,093. PLANT SPRAYING MACHINE. Patent issued October 27, to Joseph B. Kucera, Traer, Iowa, assignor to Food Machinery & Chemical Corporation, San Jose, Calif. In a spraying apparatus adapted to be mounted on a supporting vehicle, a fixed support, a pair of spray boom sections adapted to be mounted for vertical swinging movement on the vehicle, a boom suspension element mounted above each boom section, a flexible anchor mounted between said suspension elements and secured to said support, and a pair of cable like support members having their inner ends attached to said flexible anchor and having the outer end of each attached to one of said boom sections, an intermediate portion of each cable like support member passing over one of said suspension elements normally to provide equalized balanced support for said boom sections on said vehicle.

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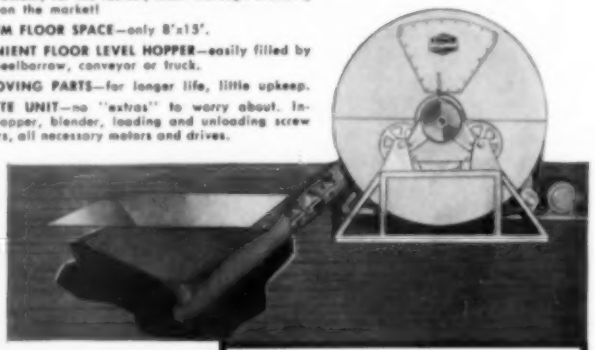

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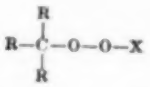
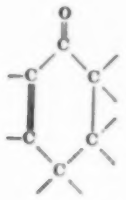
2,657,125. Organic Peroxide and Hydroperoxide Herbicides Patent issued October 27, to Lyle D. Goodhue and Carolyn E. Tissol, Bartlesville, Okla., assignors to Phillips Petroleum Co. The method of destroying a plant which comprises applying to said plant a herbicidal amount of a material selected from the group consisting of a peroxide of the formula



R—O—O—R

wherein each R is selected from the group consisting of a hydrocarbon radical and a substituted hydrocarbon radical and wherein the sum of the carbon atoms in the R groups is not in excess of 25, and an organic hydroperoxide of the formula wherein each R is selected from the group consisting of hydrogen, a hydrocarbon radical, a substituted hydrocarbon radical, and a carbocyclic ring within two R's are included in said carbocyclic ring; X is selected from the group consisting of hydrogen and an alkali metal atom; not more than two R's shall be hydrogen at the same time and the sum of the carbon atoms in the R group shall be at least 3 and not in excess of 30.

2,657,126. Polyhalocyclohexenone Compositions Adapted for Herbicidal and other Use. Patent issued October 27, to William D. Stewart, Brecksville and John H. Standen, Cleveland Heights, Ohio, assignors to B. F. Goodrich Co., New York. A herbicidal composition which comprises as the essential active ingredient from 0.1% to 50% by weight of a polyhalocyclohexenone containing 6 to 8 halogen atoms attached to the cyclohexenone nucleus of the structure



and an inert carrier therefor.

2,657,164. Chlorinated Camphor and Fenchone as Insecticides. Patent issued October 27, to George A. Buntin, Wilmington, Del., assignor to Hercules Powder Co., Wilmington. An insecticide composition comprising a polychloro bicyclic terpene ketone having a chlorine content within the range of about 50% to about 75% chlorine obtained by chlorinating a terpene ketone, selected from the group consisting of camphor and fenchone, in an inert solvent with chlorine gas in the presence of a free radical-forming chlorination catalyst at a temperature in the range of 50—100° C. to a chlorine content within said range, and an insecticidal adjuvant as a carrier therefor.

2,657,166. Chlorinated Terpene Alcohols, Esters and Ethers as Insecticides. Patent issued October 27, to William D. Stonecipher, Newark, Del., assignor to Hercules Powder Co., Wilmington, Del. An insecticidal composition comprising the product of chlorination in an inert solvent with chlorine gas in the presence of a free radicalforming chlorination catalyst at a temperature in the range of about 50° C. to about 150° C. to a chlorine content of about 40—70% of an oxyterpene material of the group consisting of isobornyl acetate, isobornyl chloroacetate, isobornyl propionate, bornyl salicylate, fenchyl alcohol, isoborneol and terpinyl chloroethyl ether and an insecticidal adjuvant as a carrier therefor.

TRADE MARK APPLICATIONS

Ara, in capital letters within hand-drawn border, for soil conditioners and fertilizers. Filed Apr. 28, 1953, by Arachem Products, San Diego, Calif. Claims use since Apr. 16, 1953.

Uran 32, in Onyx capital letters, for nitrogen-containing solutions, suitable for use as fertilizer. Filed Oct. 1, 1952, by Allied Chemical & Dye Corp., New York. Claims use since Aug. 3, 1952.

Acripol, in caps and lower case, for chemical soil conditioner. Filed Oct. 1, 1952, by R. L. Carlisle Chemical & Manufacturing Co., Inc., Brooklyn, N. Y. Claims use since Aug. 1, 1952.

Euco, in capital letters within diamond-shaped box, for peat moss for fertilizer use. Filed Apr. 22, 1953, by European & Overseas Trading Co., Hamburg, Germany. Claims use since January, 1951, and first used in commerce between Germany and the U. S. in January, 1951.

Napsul, in heavy capital letters, for soil conditioners. Filed May 7, 1953, by California Spray-Chemical Corp., Richmond, Calif. Claims use since July 15, 1948.

Goldthwaite's Turf Special, the first word in script, the next two in capital letters on reverse plate, for fertilizer. Filed May 8, 1953, by Frank Goldthwaite, doing business as Goldthwaite's Texas Toro Co., Ft. Worth, Tex. Claims use since Mar. 28, 1951.

Fulton Ratscat Rodent Repellent-Treated Bags, with drawing of bag with these words on it, and cartooned rats scampering away, for composition for applying to cotton and burlap bags to render them rodent-repellent. Filed June 26, 1952, by Fulton Bag & Cotton Mills, Atlanta, Ga. Claims use since May 1, 1952.

Sulfocide, in capital letters arranged to form a semi-circle, for concentrated insecticides and fungicides in liquid form. Filed June 27, 1952, by B. G. Pratt Co., Hackensack, N. J. Claims use since Dec. 5, 1908.

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Stokes and Smith G1 and HG86 Duplex Auger Fillers.
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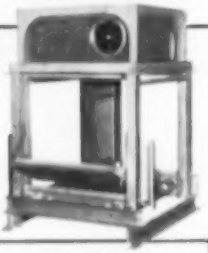

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Kenneth A. Spencer (center), president of Spencer Chemical Co., Kansas City, was recently elected chairman of the trustees of the Midwest Research Institute. He is shown here with Harry Moreland (left), president of the Great Lakes Pipeline Co., who was named chairman of the board of governors, and Dr. Charles H. Kimball (right), president of the Institute.

Seeks Distribution Rights

Page Boy Products, 115 Oats St., Carlisle, Western Australia, seeks distribution rights in Australia for agricultural chemicals of American manufacture. They do not now represent any American firm in this field, and while they recognize that at the moment such distribution may not be practical, because of exchange restrictions, they are anxious to enter into correspondence with American producers with a view to eventually working out such representation. Interested American firms may write direct to the company, to the attention of L. Nicholson.

•

Hepburn, Conn. Director Dies

Robert Gregg Hepburn, director of the University of Connecticut's agricultural extension service since 1949 died recently at his home. He had been a farm manager in New Jersey before he came to Connecticut as New Haven County agriculture agent in 1935.

•

Mo. Horticulturists Meet

The annual meeting of the Missouri State Horticultural Society was held January 4-5, 1954 at the Daniel Boone Hotel, Columbia, Mo. Featured at the meeting were a series of reports dealing with antibiotics, fruit growing and merchandising, soil moisture and irrigation. Recommendations of spray schedules for 1954 were presented by H. G. Swartwout and Wilbur Enns. A tour of the new farm to be used as the future University Horticultural farm, New Franklin, Mo., highlighted the conference.

•

Dusting Damages Discussed

Damage due to drift, and other factors which may result in crop dusting is reviewed in an article on "Crop Dusting: Legal Problems in a New Industry," appearing in the *Stanford Law Review*. The report recommends that the farmers and the pilots they hire be responsible by the courts regardless of how carefully the dusting is done. Examples of court cases in which damage due to crop dusting was the issue are cited and reviewed.

•

Fertilizer Safety Booklet

An employee's safety booklet in the fertilizer industry is being distributed by the Smith-Douglass Co., Norfolk, Va., to its various plants throughout the south, midwest, and east.

•

Hercules President Retires

Russell H. Dunham, the first president, and former chairman of the board of directors of Hercules Powder Co., Wilmington, Del., has retired from active service with the company.

•

Monsanto Revamps Inorg. Div.

J. L. Christian, vice president and division general sales manager, Monsanto Chemical Co., St. Louis, announced recently the integration of its former phosphate and Merrimac divisions.

Dr. R. L. Jenkins, who has been director of phosphate division research will continue as director of science for the new division. John R. Eck, has been named manager of the development and engineering department, Dr. C. H. Aall will continue as director of development and W. T. Durrett will be director of engineering. Staffs to carry out these functions will be located in St. Louis.

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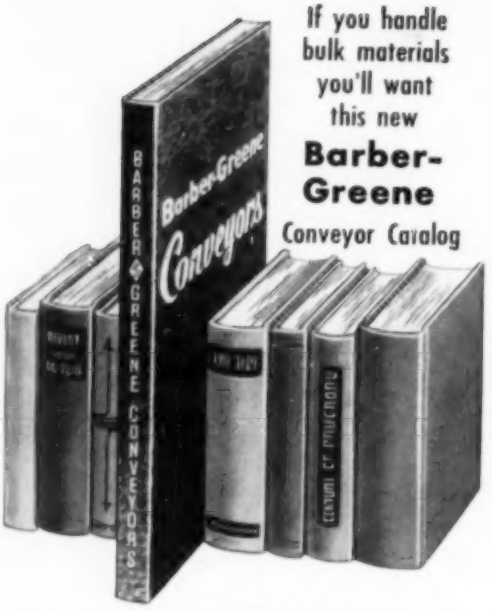

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Tale Ends

FOR its "achievement in industrial landscaping and beautification," the Frank G. Hough Co., Libertyville, Ill., was named recently by the American Association of Nurserymen for one of its top awards in national competition. The midwestern firm, manufacturers of bulk-handling "Payloaders" used widely in the fertilizer industry, has landscaped its entire factory area, making it resemble a carefully-maintained municipal park. The many beds of seasonal flowers, well-kept lawns, shrubs, evergreens and shade trees are reported to provide pleasure and pride to employees and bring from visitors many complimentary remarks.

The award is a source of particular satisfaction to Frank G. Hough, president of the company which bears his name, since he has sponsored for many years the annual neighborhood lawn and garden contests in the Libertyville community.

* * *

Dr. S. D. Gray, American Potash Institute, tells the following story on himself. He was billed to appear before a large group as a speaker and the chairman went all out to give Dr. Gray an introduction both flowery and lengthy. After several minutes of introductory talk, the chairman wound up with the enthusiastic assertion that "You'll find Dr. Gray just full of his subject."

Rising to speak, Dr. Gray reminded his audience dryly, "My subject tonight is 'Manures and Manuring'."

* * *

The latest entomological story comes to us direct from Denver, by way of Newt Hall, major domo of Pioneer Chemical Associates. One of the principal merits of the story is that it's brief.

Seems there was this termite who walked into a saloon and inquired

"Is the bar tender . . . . . ?"

* * *

The days of easy selling seem definitely behind us. This is now true of fertilizers, as well as insecticides which have been something of a sales problem, as many can attest, the past couple seasons. More attention is currently being given to sales aids, package redesign, etc. than has been noted for many years. As a case in point, one well known national marketer of fertilizer has just redesigned its full line of containers in an attempt to give them more sales punch. If you are doing the same, send us photos.

* * *

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